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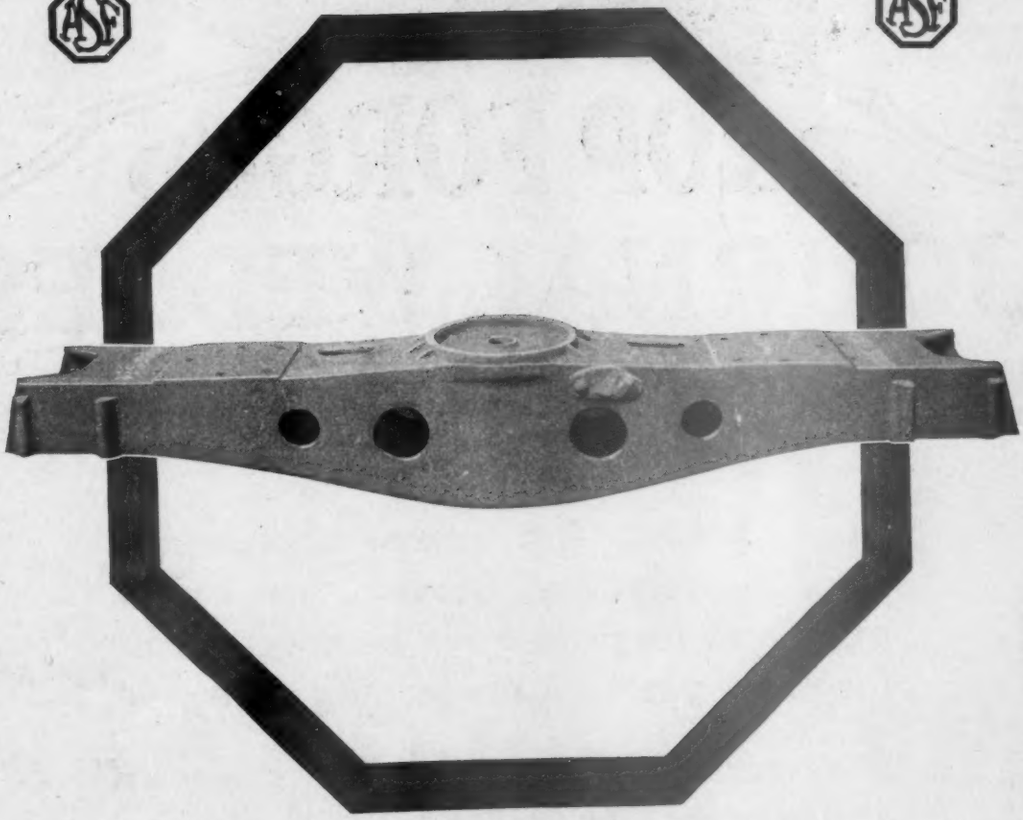

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EDITORIAL

Railway Age

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A Lesson from the World's Fair

It was just 30 years ago that Chicago was the scene of the World's Columbian Exposition, which has not since been equalled and which will always be a cause of wonder to those whose opportunity it was to visit it. It is said that the World's Columbian Exposition surpassed the expectations of the most sanguine. It afforded a striking illustration of what could be accomplished where there were determination, vision, faith and full co-operation by the many interests called upon to support the venture. In this respect the World's Fair offers a lesson which may well be considered in connection with the movement to celebrate the centenary of American railroads. This date in the history of the railroads is not far off, a matter of about five years. Much has already been said about the proposed centenary celebration. It is the thought that fitting celebration of the centenary by the railroads and the country as a whole would promote railway welfare and likewise also national welfare. This objective is analogous to the objective ahead of the World's Columbian Exposition, for basically that exposition was a venture conceived by Chicago people with a view to promoting the city's welfare, and with the belief, also, that it would be advantageous to the country as a whole. If so great a success could be made in 1893 in the face of the adverse conditions met with at that time, surely a great success can be made of the project now proposed. It was the "I Will" spirit of Chicago that put over the World's Fair and the same spirit will put over the railway centennial. In this connection the admonition of the director of the Columbian Exposition may well be quoted: "Make no little plans, they have no magic to stir men's blood and probably themselves will not be realized. Make big plans, aim high in work, remembering that a noble, logical diagram once recorded will never die."

Remote Operation of Switches

"We make for ourselves little puddles of prejudice and then we wallow in them." This cutting figure of speech will be recalled by readers who remember Mathias N. Forney, one of the notable philosophers in the railroad world of the 19th century, who sometimes applied it to the motive power officers of his day. It has been mentioned lately as a possible explanation of the slowness of the railroads of today in appreciating the great value of the well-known scheme for operating switches a mile or two distant from the operating lever. Sixteen railroads have reported that in 12 months they have saved an aggregate of over $500,000 by the use of these switch machines, or an average of $6,386 per installation; and yet the Signal Section committeemen (A. R. A.) who report these figures, and who have been studying the field with care, seem to feel sure that there are more than 16 other roads which might easily effect a similar economy but which as yet have done nothing. It is now over 20 years since the Illinois Central began operating a switch at a distance of over 5,000 ft. near Cairo, Illinois, and it is nine years since the low-cost, low-voltage apparatus was introduced. The lesson of this experience has been open to everybody. The word "prejudice" may not seem exactly applicable in the case of the remote switch machine; for probably no one is prejudiced *against* a successful switch apparatus; but perhaps we may call it prejudice *in favor of* perfection. In this matter, however, as in that of automatic train stops, it is necessary, if we are to make progress, that when the liability to dangerous failure is found to be represented by a decimal fraction which consists mainly of a row of ciphers, to consider the propriety of ignoring extreme requirements for a time. A philosopher of the 20th century has expressed Mr. Forney's idea in another way: "We like opinions better than we like facts." The data from the A. R. A. committee report, given on another page, deserves the attention of every operating officer.

The Problem of Sidings

The location and layout of sidings is a subject which, speaking generally, has never received the scientific study which it deserves. There are, of course, many individual situations which have been carefully studied and provided with facilities adequate to the requirements, but it is the exception and not the rule to find a division which is provided throughout with sufficient siding accommodations, scientifically located and designed to reduce delays to a minimum. The siding is of course much more important on a single track line than on double track, but this does not mean that on the latter it can be neglected entirely. We have in mind a double track line on which all the sidings are between the main tracks, one only being provided at each point for the use of trains in both directions. Passenger trains on this line are operated in "bunches." Freight trains, naturally, have to get into the clear to be passed by these passenger trains. The middle passing track serves this purpose very well except at the point where "bunches" of passenger trains in opposite directions meet. Near this point freight trains in both directions have to clear the time of the passenger trains on the single passing tracks, thereby wasting much precious time in backing out, "sawing by" or in other devices by which it is possible, but scarcely profitable, to operate a railroad. To what extent are single track sidings for use by trains in both directions installed on double track lines as the result of a well-thought-out plan?

Has the Traffic Peak Been Reached?

The weekly carloading reports of the Car Service Division of the American Railway Association now seem to indicate the probability that the peak of this year's freight traffic has been experienced and that the usual end-of-the-year decline has begun somewhat earlier than usual. The peak thus far was in the week ended September 29, when 1,097,274 cars were loaded with revenue freight. Since then there have been four weeks in which the loading has been less than that figure and, whereas in many years traffic has continued to increase up to the last week or two of October, the loading for the week ended October 20, reported this week, shows a total of only 1,072,881 cars, which has been exceeded in four earlier weeks. There is, of course, still a possibility of a further

increase in the week ending October 27, but when it is recalled that the loading for the week ended September 1, which was 1,092,567 cars, was not exceeded in any of the first three weeks of October, such an event now appears rather unlikely. The fact remains, however, that the total car loading for the year up to date has exceeded all previous records and in two weeks in September the loading has exceeded the estimate of 1,085,000 cars made by the Car Service Division last spring, as representing a rough forecast, based on the experience up to that time, of the peak loading for the year. Because of lighter loading per car and some differences in the character of the traffic, the car loading figures have made a somewhat better showing in recent months than the ton-mile figures, which for June, July and August had been exceeded in the corresponding months of other peak years, but as a measure of actual physical performance of the transportation machine the car loading figures stand unchallenged.

The Wattmeter in Shop Operation

No demonstration is needed of the importance of knowing detailed costs in order to secure more efficient railroad operation. While not commonly so considered, the wattmeter, of both the indicating and recording types, is an extremely effective means of checking comparative costs through the knowledge of electrical power consumption which this instrument furnishes. It can be used in a study of department or individual machine operations of which the following may be taken as an example: One inquisitive and progressive shop foreman desired to know whether it was more profitable to run his flue rattler fully or only partially submerged in water. A small recording wattmeter was therefore installed in the power line to the 20-horsepower electric motor which drove the rattler. The wattmeter indicated an average power consumption of 12 kilowatts with the rattler over one-half submerged and containing 25 6-in. flues, 20 ft. long. With the water lowered in the pit, an increase of power consumption to 20 kilowatts was noted due to the fact that water in the flues had to be lifted above the pit level. With the pit completely empty, however, and water all out of the flues the power consumption decreased to 10 kilowatts as might be expected. The water level in the pit was then gradually raised with a corresponding increase in power consumption to a maximum of 20 kilowatts with the drum submerged 16 in. This test proved beyond a doubt that the condition for minimum power consumption consistent with getting the flues clean was to have the drum slightly over one-half submerged, or with just enough water to cover the flues. Wattmeters and similar instruments have proved of definite value in studying shop operations.

Maintenance of Equipment Expenses

The factor of greatest interest in the monthly earnings reports of the Class I railroads is always, of course, the net operating income and the rate of return. In the case of the September figure, the factor of next greatest interest will be to see whether the carriers have finally succeeded in reducing to more normal figures their maintenance of equipment expenses. These have been abnormally high since September a year ago because of the shopmen's strike and the extraordinary efforts the railroads have made during the present year to reduce their bad order cars and unserviceable locomotives to the respective levels of 5 and 15 per cent desired by the A. R. A. transportation program. The net operating income in August totaled $98,343,235, equivalent on an annual basis to 4.94 per cent on the tentative valuation. To have been at the rate of 5¾ per cent, which the Interstate Commerce Commission has established as reasonable, the net should have totaled $114,434,545. September is supposed, because of seasonal variation of traffic and earnings, to supply a larger proportion of the year's total net than is August. To earn on an annual basis of 5¾ per cent in September, the carriers should report a net operating income of $118,936,565. The monthly earnings statements now being filed give indication that the net operating income for September should exceed that which was reported for August. It remains a question, however, whether the September net will be sufficient to reach the desired 5¾ per cent. With reference to maintenance of equipment expenses, the salient feature is in the fact that in the first eight months of 1923 the charges to this account totaled $981,295,749, which amount was 26.8 per cent greater than in the first eight months of 1922. As contrasted with this, total operating revenues in the first eight months of 1923 were 18.8 per cent greater than in the same period of last year, maintenance of way expenses were only 10.8 per cent greater, transportation expenses 15.6 per cent greater and total operating expenses 17.0 per cent greater. This means, possibly, that enough money was not spent for maintenance of equipment in the first eight months of last year and it reflects the cost of the strike and represents the cost of the work done to secure success in meeting the ideals of the transportation program as to equipment condition. Naturally the point is to be made that had not the maintenance of equipment expenses been so large the net operating income itself would have been larger than it actually was. In August, charges to maintenance of equipment totaled $127,933,876, the largest amount charged to this account for any month since October, 1922. Indications are that the charges in September were less than they were in August. Just how much less they were will not be developed, however, until the complete report for September becomes available within the next week or two.

Tendencies in Freight House Design

THE FREIGHT HOUSE of the Union Pacific at Los Angeles, described elsewhere in this issue, is a typical example of the present stage of development of the single-level freight station. It is of greater interest to most railway officers than some of the recently completed multiple-story stations because the single-level type will have far greater application to the local freight terminal requirements of most American cities for many years to come.

Although a considerable number of multiple story stations have been built in recent years, it must be conceded that their use is definitely restricted to installations imposing two special conditions, a separation of the street and track grades and exceptionally high land values. Most of the recent installations of this type of freight house have been built to replace old single-level stations that have grown inadequate for the business offered where the larger facilities must be provided with little or no increase in the ground area occupied. But the greater capacity is obtained at a sacrifice in operating economy. Two-level operation is more expensive than one-level operation, not only because of the added cost for raising or lowering all the freight which passes through the house, but also because the transfer from one level to the other interferes with the expeditious handling of the freight and the effective supervision of the operating force.

Studies of the multiple-story houses now in operation have convinced most railway officers of the superiority of the single-level house where the local conditions make their construction feasible. In other words, it may be said that the

typical freight station of the future as in the past in the vast majority of cases will consist essentially of a covered platform interposed between the house tracks on one side and the street vehicles on the other. Future developments, therefore, will consist essentially in a determination of the most appropriate design for such a structure covering such features as height of platform, width, panel spacing, etc., and the selection of the most appropriate type of construction for the various details, such as the floor, roof, walls, doors, windows, etc.

As a case in point, it will be noted that the Los Angeles freight house is equipped with wide platforms on either side, a feature of unquestioned value where the ground area available permits of the utilization of a considerable portion of the space for other than actual occupancy by cars, street vehicles and usable platform area. Another feature of the Los Angeles installation which deserves special mention is the facilities provided for the unloading of automobiles in a building and on a platform entirely independent of the freight house. While there is probably special need for such facilities in the city which has the largest per capita ownership of automobiles in this country, it must be conceded that the growing importance of this traffic in other cities imposes a burden on the railroads which must be met by provision for adequate platforms and other unloading facilities.

Lawmakers' Efforts to Make Crossings Safe

THE ACTION of the legislatures or commissioners (or both legislatures and commissions) of a majority of the states in their attempts to provide regulations to prevent the slaughter of men, women and children in automobiles at railroad crossings are to be definitely commended; and the data which we have gathered and which will be found on another page of this issue, may hopefully be taken as indicating some progress, and as containing some promise of further progress. The mere assembling of these notes, from different states, should be a stimulus to action.

And yet the evidence of actual improvement in safety, thus far, is very "spotty," and hard to measure. The problem is a very difficult one. As we observed in discussing court decisions last week, there should be no need of a statute or of commission orders of any kind. In all reason, it is proper to say that the common law requires every driver of any kind of vehicle always to "look out for the engine," as the sign boards have shouted at him for 75 years. The duty is absolute and unqualified. But a considerable percentage of automobile drivers are fond of taking risks (as we see everywhere, not alone at railroad crossings); and, to keep this percentage from killing themselves and their innocent passengers, some police restraint is necessary.

What can it be? In a great majority of cases, no doubt, a full stop is not necessary. Only five states have gone so far as to enact sweeping stop-laws; and these cannot as yet give more than fragmentary reports of progress. To be reasonable, a stop law must allow various exceptions; but nobody knows how to formulate a satisfactory statement of these exceptions, and so all grades of drivers—wise and unwise, witted and half-witted—do as they please. Tennessee, where a stop-law has been on the books for six years seems, as yet, able to give little advice to other states. Both there and in Virginia and North Carolina there are evidences of good influence of the statutes on the better class of drivers; they respect the law and set good examples; but what may be the effect of good examples on those people who are dull or careless or ignorant, remains to be seen.

In casting about for ways to educate automobilists in this matter, the promulgation of rules applying only to common carriers—cars which presumably will bear many people and in which the driver is always responsible for the lives of others than himself—has seemed to be a reasonable first step, and many states have adopted it. A stop rule for passenger carriers is a natural adaptation of the time-honored rule for railroad trains at such crossings of tracks as are not provided with interlocking signals; but there is no way of enforcing obedience to the rule, and already, since these regulations have come into vogue, there have been omnibus drivers who have nevertheless wrecked their cars by heedlessly running on to crossings. Railroad officers could tell of difficulties in enforcing the stop rule even with enginemen amenable to discipline; what can be expected of drivers on the highway, not only undisciplined but perhaps unknown?

It would seem reasonable to require that all establishments, such as omnibus lines, which operate under state licenses or permits, keep records of their drivers and of their training and behavior, and make suitable monthly reports. Under such an arrangement, definite and authentic information concerning crossings, in all varied situations, could be gathered and studied; and quite likely it might afford useful light on how to formulate and enforce the best practicable police rules everywhere. It is obvious that the present chaotic conditions cannot be allowed to continue forever, and every public officer whose duties have to do with this business is in duty bound to be constantly on the lookout for useful ideas. In many situations the alert automobile driver finds—or, at least, believes—that to stop for a crossing would do more harm than good. It might endanger other cars behind him; or might produce such a street blockade that the congestion alone would introduce new dangers. At many crossings the tracks are so little used that stopping is generally regarded as a farce. Enforcement of rigid rules at such crossings will never be approved either by legislatures or by courts.

Indeed, this whole problem has to do mainly with crossings at which any rule whatever will have to enforce itself. Crossings where there is enough travel to warrant the employment of inspectors have, as a general thing, been provided for already. The only "rule" that will surely enforce itself is a rule of absolute physical force; as, for example, a fence or a wall, making the highway so crooked that it cannot be traversed except at very low speed; or a hump in the roadway which will make high speed always dangerous.

The Great Question of Railroad Valuation

THE QUESTION of railroad valuation is, regarded from some points of view, the most important question now being considered in the United States. It is both a legal and an economic question. From a legal standpoint the way it is settled will largely determine the property rights of those who have invested capital in railroads. It will do more than this. It will largely determine the property rights of the owners of all other concerns which are now held by the courts, or may in future be held by them, to be "affected with a public use."

As an economic question it is relatively unimportant from the standpoint from which its importance is most often emphasized, and of very great importance from certain standpoints from which its importance is much less often emphasized. Those who seek to secure the lowest possible valuation of the railways do so mainly upon the ground that a high valuation will make railway rates high and a low valuation will make them low. As a matter of fact, whether the valuation is made high or low will have relatively little effect on rates. If the railways were now earning the return upon their tentative valuation to which the Interstate Commerce

Commission holds they are entitled, and the valuation should be increased one billion dollars, while all things remained equal, this increase of the valuation would authorize an advance of less than 1 per cent in all railway rates. Likewise if it were reduced one billion dollars this would authorize a reduction of less than 1 per cent in all rates.

The increase or reduction of earnings caused by a change in the valuation would, however, cause an equal increase or reduction of the net return allowed to be earned. If the railways were now earning the net return to which the Commission holds they are entitled, their net return would be only about one-sixth of their present total earnings. Therefore, a change of 1 per cent in rates and *total earnings* due to a change in the amount of the valuation would cause a reduction or an increase of from 5 to 6 per cent in the *net return*, and a change of one-third upward or downward in the valuation would make a difference of one-third in the total net return the railways were allowed to earn. Directly and indirectly all interest and dividends must be paid and all improvements in and additions to the property made from the net return. Therefore, the valuation finally made will very largely determine the interest and dividends investors in railways will receive and the extent to which the service rendered by the railways can be improved and increased.

Since the question of railroad valuation is of such great importance, and since the valuation finally placed upon the railways undoubtedly will be largely determined by the influence exerted by public opinion upon the decisions of the Interstate Commerce Commission and the courts, it is desirable that the largest possible number of people, and especially the largest possible number of railway officers, should be made acquainted with both the legal and the economic questions involved. The fact is, the legal and economic questions involved are so intertwined that it is almost impossible to consider them separately. Leslie Craven, valuation counsel of the western group of railways, delivered an address entitled "Railroad Valuation: A Statement of the Problem" at the recent annual meeting of the American Bar Association. We publish elsewhere in this issue an article giving lengthy extracts from Mr. Craven's address, and we believe railway officers of all classes will profit by reading it.

Mr. Craven points out clearly the wide difference between the problem of making a valuation of a public utility such as an electric light plant, and a valuation of a railroad system. An electric light plant usually has a monopoly of its business, and a valuation of it can, therefore, be made without any consideration of its relationship to other electric light plants. On the other hand, every railway parallels and competes with other railways, all railways in the same group must charge approximately the same rates and therefore the aggregate valuation placed on each group of railways will largely determine how much each railway in the group will be allowed to earn.

As Mr. Craven points out, "the development of the doctrine (of valuation) in rate regulation cases was a natural step from its expression in condemnation cases." The courts had held that if property is taken for public use under the power of eminent domain the owner of it must be paid not what it cost but its value at the time it was taken. For a third of a century they have held that to fix rates for a railroad or public utility which are non-compensatory is equivalent to taking its property under condemnation without paying for it what it is worth; that to thus make rates is unconstitutional; that the proper method for determining whether rates are compensatory in a constitutional sense is to ascertain whether in charging them the railway or public utility can earn a "fair return upon the fair value" of its property; and that a valuation of its property consists not in determining what it has cost, but what is its fair value at the present time, the plain implication being that a valuation used as a basis for regulating rates should, as nearly as may be practicable be arrived at in the same way as a valuation of a piece of property taken by condemnation.

There is, however, one great difference between the problem met in making a valuation of property for the purpose of condemnation, and the problem met in making a valuation as a basis for regulation of rates. The earning capacity of a property must be and is given great weight in determining its value in a condemnation case. It is much more difficult to give earning capacity proper consideration in making a valuation for the regulation of rates, because the very purpose of valuation in this latter case is to determine what the property ought to be allowed to earn—in other words, what its earning capacity ought to be. But, whatever may be true in the making of a valuation of a public utility such as an electric light plant which has a monopoly in its field, the superior locations of well located roads which are reflected in superior earning capacity cannot be ignored in making a valuation of railroads. Under any schedule of rates that may be fixed the net earnings of different railroads in the same territory will differ widely. If earning capacity were ignored two railroads paralleling each other might be given the same valuation, although one was making net earnings twice as great as the other. This would be to ignore all definitions of the word "value," or to give it an entirely new definition.

Mr. Craven's address shows clearly that from the hearings before the Interstate Commerce Commission and the work of its Bureau of Valuation have emerged two widely different theories as to the way in which the railways should be evaluated. One of these is that the valuation should be based entirely on "cost." There are two schools of thought even on the question of the "cost" that should be considered. One school claims the only thing that should be considered is an estimate of what it actually has cost to construct and develop the railways. The other claims that the principal or even sole, factor that should be considered is an estimate of what it would cost to reproduce the properties now.

The second theory which has emerged is that the value to be ascertained is the value in the sense in which the word "value" ordinarily is used—the sense in which it is used in respect to the worth of property taken by condemnation. This means that the true value of the railways must be considered. It is difficult to see how there can be any escape from the logic with which Mr. Craven arrives at the conclusion that this is the sense in which the Supreme Court of the United States always has used the word in rate regulation cases.

But if in the valuation of all the railways of the United States their earning capacity, which always is such an important factor in the valuation of a property to be taken by condemnation, is to be given weight, how and as of what date is their earning capacity to be determined? For more than 15 years the net return earned by each railway and each group of railways has been the result not only of the efficiency and economy with which they have been managed, but also of rates fixed for them by state authorities and the Interstate Commerce Commission, which often have been unreasonably depressed. The net return earned by them during this time has varied, but its general tendency has been downward, and during the last three years it has been relatively less than in any other three years since complete statistics of earnings have been kept. A valuation of the railways as a whole based upon the net return earned within recent years would be almost as small as the lowest valuation that has been advocated by Senator Brookhart of Iowa or Mayor Hylan of New York.

The valuations placed by the Commission upon individual railways apparently are based chiefly upon what it would cost to reproduce their physical properties at the wages and prices which prevailed prior to June 30, 1914. Statements made by members of the Commission indicate that the unit costs of 1910 to 1914 were adopted because they approximated closely to the average costs which had prevailed for a period of 20

years. Since almost one-half of the investment represented by the railways in 1914 was made during the previous 20 years, the Commission's estimates of the cost of reproduction as of that time were evidently regarded by it as also approximate estimates of what the railways actually had cost. Some things the Commission has said and done indicate that its idea of the way in which to bring the valuations up-to-date is to add to the valuations as of 1914 and 1915 the additional investment which had been made in the railroads since then. Since most wages and prices have doubled since 1915 it is difficult to believe the courts would hold that this method would make sufficient allowance for what it would cost to reproduce the properties at the present time. On the other hand, there is nothing in the decisions of the Supreme Court to sustain the view that it would uphold a valuation based entirely on what it would cost to reproduce the railways at present unit costs of wages and materials.

It seems probable that the valuation finally placed upon the railways will be substantially more than any well-founded estimate that might be made as to what they have actually cost. Their owners are entitled like other owners of property to benefit by the normal increase in the value of their property. It seems equally probable, however, that the courts will never uphold the view that the valuation of all the railways should be based entirely or principally upon an estimate of what it would cost to reproduce them at the present time. The total valuation probably will be somewhere between those two extremes.

But is the valuation of all roads to be on a basis of cost, and without reference to the superior location of the better roads not reflected in cost? This is a question of great importance, one reason being, as Mr. Craven points out, that its settlement will determine what amounts the more profitable railroads will have to pay the government under the recapture provisions of the Transportation Act. Mr. Craven does not suggest that the value should be determined by capitalizing earnings under present rates or under the rates which have prevailed during recent years, when, as is well known, the carriers have not earned sufficient returns to provide adequate transportation facilities for the country. He contends that rates should be *made* as a legislative matter on a basis to reflect the broad considerations of public policy necessary to provide adequately both for the public and the carriers. Rates ought not to be made as a legislative matter on the rock-bottom basis of confiscation. As the Transportation Act is administered, that is the basis now employed. Mr. Craven suggests that as a legislative matter rates for a group of roads ought to be made on the probable cost of reproduction of the railroads in the group. Under the rates established under such a valuation, however, one railroad may be able to earn only, say, 4 per cent on its own cost valuation, while another may be able to earn 10 per cent. Mr. Craven contends in effect that a return of 10 per cent on the cost under such conditions would not be unreasonable but would be a reasonable return on the value properly reflecting a consideration of the superior location as a result of which such earnings were possible. In the event of a recapture, however, the basis of valuation would be the basis defined by the confiscation cases. Then the true value of the property would have to be determined. The logic of Mr. Craven's argument seems clear that in that kind of a case, unless consideration is given to the superior location of the good roads, and if the basis of valuation is a cost figure not reflecting such superior elements of value, a confiscation of those elements of private property will be effected. The Supreme Court has always said that such elements are private property.

Mr. Craven's address is an interesting and valuable contribution to the discussion of a question which is of great importance, which is far from settled and which will be the subject not only of much more discussion, but probably of some historic struggles in the courts.

Machine Tools Will Not Last Forever

THAT THE CHARACTER of shop facilities on the railroads is not in keeping with the increase in the size and amount of equipment to be maintained is a fact that will be generally accepted without argument. There are several causes for this condition, one of which lies in the fact that equipment and other facilities having a direct relation to transportation must, of necessity, take precedence over shop facilities, which are only indirectly related to transportation, in the apportionment of such appropriations as the credit of the railroads will provide. This situation cannot be entirely cleared up until the credit of the railroads is restored to such a basis that there will be no limit to their ability to raise capital for any purpose which in itself will justify the investment.

But not all of the difficulty can be charged to this condition. A comparison of the shop machinery depreciation charges with the equipment depreciation charges in the maintenance of equipment accounts indicates very clearly that the railroads are failing to use the shop machinery depreciation account as it should be used. Beginning with the year ending June 30, 1915, for which the present accounting rules became effective, the charge set aside for depreciation of steam locomotives of the Class I railroads amounted to 13.6 per cent of the amount actually spent for repairs. Owing to the rapid increase in the annual expenditures for repairs during the next few years the ratio of depreciation to repairs declined to 6.3 per cent in 1920, but increased to 9.2 per cent in 1921. Similarly, starting with 28.8 per cent for freight cars in 1915, the ratio reached a minimum in 1920 of 13.5 per cent and increased in 1921 to 17.7 per cent, while for passenger train cars the ratio was 26 per cent in 1915, 11.6 per cent in 1920, and 14.9 per cent in 1921. The contrast between these ratios for the three classes of equipment and that for shop machinery is striking. For the fiscal year ending June 30, 1915, the first in which any provision had been made in the accounting classification for shop machinery depreciation, the amount reported was .3 per cent of the amount actually expended on shop machinery repairs. Inasmuch as this account was new for that year, it may not be representative. In 1916, the depreciation charges had increased considerably, but only to the extent that they amounted to 1.2 per cent of the $11,500,000 spent for repairs. With the increase in general maintenance expenditures, the cost of machine tool repairs increased to $29,662,000 in 1920, while the depreciation charges increased from $136,000 in 1916 to $204,000 in 1920, the ratio declining to .7 per cent. In 1921 with the repair expenditures reduced to $19,247,000 and a slight increase in depreciation charges to $241,000, the ratio had been restored to 1.25 per cent.

It is evident that the policy with respect to shop machinery depreciation is far different from that with respect to equipment. Indeed, it may even be doubted whether a large number of roads have any policy at all on this matter. At first sight this may appear to be entirely a technicality of accounting practice. But it has a very practical bearing on the modernization of shop machinery. Unless proper depreciation charges have been set up during the life of a machine tool, when the time comes that it should be replaced with one of modern design capable of effecting marked reductions in shop costs, the necessity for charging off the retirement of the tool in a lump sum, with the consequent heavy burden on operating expenses, becomes a serious obstacle in the way of securing the replacement of the obsolete tool.

The depreciation account should be used constructively as a means of facilitating the installation of modern shop machinery, just as it is used to keep the supply of cars and locomotives apace with traffic requirements.

Three Years' Reduction in Cost of Railroad Service

IN THE SUMMER AND FALL of 1920 the operating expenses of the railways reached the highest level to which they ever advanced. There had been very large increases of operating expenses during the 26 months of government control which ended on March 1, 1920. A great further addition was made to expenses when the Railroad Labor Board granted a large advance in wages which was made effective from May 1, 1920.

A comparison of the operating expenses of the railways in the months of 1920 after this wage advance was put into effect with their expenses for the corresponding months of 1923 shows what great progress has been made within the last three years in increasing efficiency and economy of operation. It was impossible to make any such comparison until the Interstate Commerce Commission's statistics of earnings and expenses for August, 1923, became available, because in 1920 the wage advance award, which was handed down in July, was made retroactive to May 1, and almost the entire advance in wages for the four months May-August, inclusive, was put into the operating expenses in August.

In the four months May-August, 1920, inclusive, the total operating expenses of the railways were $2,117,000,000, or an average of about $529,000,000 a month. In May to August, 1923, inclusive, they were $1,680,000,000, or $420,000,000 a month. The average reduction of operating expenses was $109,000,000 a month. The freight business handled in these months of 1923 was approximately the same as in 1920. The passenger business handled was less, but the amount of train service that had to be rendered to handle the passenger business was about the same.

It has often been claimed that the managements of the railways have secured reductions of expenses only through reductions of the wages of the employees. The wages paid in May-August, 1920, averaged about $334,000,000 monthly, while in 1923 they averaged only about $260,000,000 monthly, a reduction of approximately $74,000,000 a month. But all this reduction in wages was not secured by reducing the average wage paid to each employee. The average number of men employed in May-August, 1923, was almost 129,500 less than in May-August, 1920. The saving due to this reduction in the number of employees, which was a result of an increase in efficiency of operation, was about $16,500,000 a month. Therefore, of the total reduction in operating expenses secured about $57,500,000 a month was due to reduction of wages, and the remaining $51,500,000 a month was due to reductions in the amount of labor employed and to other economies that were effected.

How much of the reduction of operating expenses was passed along to the public in reductions of the amount it paid for transportation? Rates were not advanced until the end of August, 1920, and in consequence large deficits were incurred which were covered by government guarantees to the companies that were in effect until the end of August, 1920. The total amount the public paid in rates in May-August, 1920, was $2,037,000,000. When the deficits the public had to pay are added, and the taxes paid during these months by the railways to the public are deducted, it is found that the total cost to the public of the transportation service rendered was $2,465,000,000, or about $616,000,000 a month. In May-August, 1923, the amount paid by the public in rates was $2,189,000,000. Deduction of the taxes paid by the railways to the public shows that the net cost to it of the transportation service rendered in May-August, 1923, was $2,074,500,000. This was less than $519,000,000 a month, or over $97,000,000 a month less than in May-August, 1920.

To sum up, the railways within three years, operating under the Transportation Act, reduced their operating expenses $109,000,000 a month and passed almost nine-tenths of the saving along to the public. This record does not speak badly either for the Transportation Act or the way the railways have been managed under it.

Some Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

From Indian Trail to Electric Rail, by Thomas H. Leonard. "The Beginning of Our Railways," Chapter 37; "Railroad from Hopping Station to Atlantic Highlands Completed—1883," Chapter 38; "A Gala Day—Opening of the New Railway," Chapter 43. 665 p. Published by Atlantic Highlands Journal, Atlantic Highlands, N. J.

The Mexican Nation, A History, by Herbert Ingram Priestley. For railroads see Index, but especially Introduction, p. xiv-xv, and Chapter 23, "The Rise of Porfirio Díaz." 507 p. Published by Macmillan, New York.

People and Politics Observed by a Massachusetts Editor, by Solomon B. Griffin. Railroads of the 70s, p 1-8, free passes, p. 55-56, C. W. Chapin of the Boston & Albany, Commodore Vanderbilt and J. M. Thompson of Adams Express, p. 73-77. 510 p. Little, Brown & Co., Boston.

The Tail of the Hemisphere—Chile and Argentina, by Frank G. Carpenter. "The Railroad Backbone of Chile," Chapter 14; "Over the Andes by Rail," Chapter 19; "Argentine Railways," Chapter 38. 298 p. Published by Doubleday, Page & Co., Garden City, New York.

Too Much Government, Too Much Taxation, by Charles Norman Fay. "Government War Control of Railroads," p. 72-86, Government attitude towards railway strike, 1922, p. 149-153. Under "Useless U. S. Boards and Commissions," Mr. Fay includes the Interstate Commerce Commission and the Railroad Labor Board, and under "Useless State and Local Boards," the railroad and warehouse commissions, Chapters 5 and 6. 416 p. Published by Doubleday, Page & Co., Garden City, New York.

Traffic Management, by A. T. Patek. Dedicated to the freight traffic student and designed to aid in developing freight traffic ability. 425 p. Published by Commerce Text-Book Co., St. Louis, Mo.

Women and the Labor Movement, by Alice Henry. Statistics and discussion of women in transportation industry, p. 57, 62-63, 70. 241 p. Published by Doran, New York.

Periodical Articles

Florida: The Desert and the Rose, by Clara G. Stillman. No. 41 of "These United States. Railroads and Floridian Development," p. 485-486. Nation, October 31, 1923, p. 485-487.

National Growth of the United States. Tabloid history, chiefly in maps. "Land and water routes, 1829-1860," and "Present Lines of Transportation," p. 26. Railroads, p. 26-27. Boy's Life, October, 1923, p. 26-27.

Railroads and the Mechanics of Social Power. II. The Technique of Industrial Monopoly. III. The Pools of Power, by Amos Pinchot. Nation, October 24, 1923, p. 458-460, and October 31, 1923, p. 488-490.

Railways to the Rescue. Editorial on Virginia railways' response to state auditor's appeals to pay their taxes before due to avoid a crisis in the state's finances. Southern Planter, November 1, 1923, p. 14.

The Unscrambling of Reading, by Benjamin Graham. Magazine of Wall Street, October 27, 1923, p. 1184.

Letters to the Editor

[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

The Mechanical Convention in 1924

CHICAGO.

TO THE EDITOR:

Knowing that you are always glad to publish the views of your readers upon subjects of interest such as the question of holding a mechanical convention and exhibit next year, I think I am expressing the views of all concerned when I say we are always pleased to abide by the decision of the railway executives in such matters. However, I believe that the convention and exhibits are a paying proposition to both the railways and the railway supply men. Obviously the older railway men are not so much interested in all of the exhibits; however, each year brings out new ideas and improvements that they are interested in and one would be surprised to know how many of them visit the booths to check up on devices that they have seen a number of times in the past.

At each convention we meet a lot of new men; young fellows who are interested in everything. These boys are the coming master car builders, superintendents of motive power and even higher officials, according to the ability they show. The exhibits are a school to these fellows and I think should be continued indefinitely. There is a personal equation of immeasurable value to the railroads in having their men meet once a year, keeping a hand-shaking acquaintance—older men meeting the new ones, new ones meeting their elders and rubbing shoulders. This has a tendency to eliminate the friction that is bound to result in our present system of interchange service. From past railroad experience, I know these disputes by correspondence are a large part of interchange work and it was always harder for me to quarrel with a man whom I knew than with a stranger. Men who know one another are less liable to fight and our railroad system cannot have too much friendly co-operation.

Some people question the cost of holding the convention, but this is very small when applied to all of the purchases made by railroads. The cost of seeing railway men at the convention would be much less than the cost of traveling to their different homes. Frequently after making long trips to see different railroad men, you find them so occupied with their work that they cannot give you the same attention that they do at the convention where they are entirely free. Consequently, it would take several trips to their home offices to do the same work that can be done at one convention. We have no statistics to compare the cost of the two methods, but I am satisfied that it is much cheaper to get together at some point in our country outside of a large city once a year or perhaps once in two years.

I am reliably informed that the railroads of the United States spent approximately $1,400,000,000 for material and supplies in 1921 and about the same amount in 1922. It costs approximately $1,000,000 to hold our convention for one week with exhibits and in order to bring the cost up to this figure we must include the salaries of all men in attendance. Therefore, the convention cost is .07 1/7 per cent (seven and one seventh hundredths of one per cent) of the amount spent for materials and supplies. This is a remarkably small percentage and it does not seem possible to do the same amount of work at such a small cost in any other way. You understand that a portion of this million dollars spent on the convention is returned to the railroads in the way of carfare and freight. I believe there is something over 300 carloads of materials shipped to and from Atlantic City for this convention.

I, however, would like to see the convention held at some more central point if we could find a small town with sufficient hotel facilities. French Lick, Ind., I believe would be a good place and it would warrant spending some additional money on facilities in order to hold the show there.

It has been suggested that the convention sessions be held in some other place in Atlantic City instead of on the pier. Personally I am very much opposed to this. I believe the railroad men should put up with the little inconveniences they have in what you might call "running the gauntlet" to get to their convention hall. In fact, if it is decided not to use the pier for the convention hall, I would strongly recommend to our people not to have an exhibit.

Holding a convention in a large city like Chicago, New York or St. Louis, I believe is a mistake. There are so many outside places aside from the exhibit that appeal to a large number of men, that I doubt very much if we could hold a good attendance.

In conclusion, I respectfully suggest that the work done by the Mechanical section of the American Railway Association is and should be jointly shared between the railroads and the railway supply houses. We of the railway supply fraternity have a personal interest in building up railroad equipment I think equal to that of the railroads.

L. T. CANFIELD.

Turns of the Red Tape Worm

NEW YORK.

TO THE EDITOR:

Yes, we have no red tape worms on our railways.

The constructive criticisms in "Future Company Accounting and disbursement," *Railway Age*, May 5, 1923, are supplemented by the following which the Omaha World-Herald of October 6 quotes from an article by W. F. Cramb in the Fairbury (Neb.) Journal:

Advice to Railroads

Invitation has been extended by the railroads through some of their newspaper advertising for suggestions in bettering service to the public. At the present time there is a determined attempt to put down rail rates, which the management of the railroads resist, claiming expenses are too high. We believe expenses of railroads are too high to justify any great reduction in rates, but since the railroads have asked for suggestions, we offer one: Reduce expenses.

Naturally the railroad officials will come back at us with another question, how? And we modestly suggest that they cut out the red tape in their offices, for one thing.

As an example, we have before us a check, draft, voucher or whatever it may be called, a piece of paper authorizing us to collect $1.50 from the St. Joseph & Grand Island Railroad Company, a part of the Union Pacific system. This draft is a wonderful affair. Bear with us while we recite what it contains. Here are the parts put in with a typewriter:

"No. 25145 A-711, September 12, 1923. To the Fairbury Journal, W. F. Cramb, Editor and Owner, Fairbury, Neb., 1923, September 1, September 1923, for advertising reduced fares to St. Joseph and return account Pony Express celebration, as per bill on file in auditor's office, $1.50. Registered."

Then follow five signatures written in ink, as follows: "Calculation and preparation of voucher correct: Otto Wall, For the auditor. Approved, W. K. Lockwood, Chief Clerk Gen'l Freight & Pass. Agent. Approved: S. E. Stohr, General Freight and Passenger Agent. Approved for payment, L. D. Brown, For the Auditor. W. F. Treuger, Assistant Treasurer."

Just above the name of the last signature, it reads, partly printed, partly written with a typewriter:

"When signed by the assistant treasurer or his duly authorized representative, and properly endorsed by Payee, this voucher becomes a Sight Draft on this company for one and 50/100 dollars, $1.50 in full settlement of above account and is payable at the office of the company. St. Joseph, Mo., Sept. 27, 1923. Payable at the option of the holder through any bank."

Note the red tape used in paying this small account. We had for a number of years on display in our office a similar voucher and draft for 25 cents issued by the Union Pacific Railroad Company. It was displayed for the purpose of showing why railroad companies cannot reduce rates.

When it takes five different signatures to fill out a check for $1.50, that's too many. When the check has to be filled in with a typewriter, stamped with rubber stamps and written over by five different persons in ink, that's too much work. If newspapers were run that way, we as editors and publishers of country papers would starve to death. The average country editor can tie one hand behind him and run his paper better, so far as the bookkeeping is concerned, than the railroad that uses up so much energy paying its bills.

If this same inefficiency runs through the bookkeeping department it is not improper to presume that it runs through all departments. . . . .

If the railroads want suggestions, we offer them this one, that the next time they owe this office a dollar and four bits they authorize their agent to drop around this way and pay it out of his pocket change. We will give him a receipted itemized statement and he can forward that to the advertising headquarters where it can be immediately checked into the expense account and thrown in the waste basket and forgotten.

This will save $8.95 worth of valuable time of the various clerks, officials and semi-officials who are wasting their substance making out vouchers such as described above and this much money can be credited to the stockholders' account, showing that much profit and enabling the Interstate Commerce Commission to reduce freight and passenger rates because the net income of the railroads has increased.

The railroads must get things done without so much energy being wasted. When this is accomplished, rates can come down, shippers and stockholders are both happy and no one is injured and a lot of reserve energy is set free to create wealth that is now being wasted signing unnecessary names, writing unnecessary dates and checking back and forth to no purpose. D. A. D.

Early Costs Recognized by Pennsylvania Commission

New York.

To the Editor:

The history of early railroad construction is replete with a record of costs and hardships overcome by early railroad builders in building the American railroads.

Possibly no form of enterprise had so many unforeseen and unexpected costs, such as difficulty of financing, contingencies and the like, as building railroads. However, on account of incomplete records in many cases the existence of such costs has been denied.

The regulation of railroad rates by commissions seems to have become a permanent practice in the United States. As soon as rate regulation is attempted, it is at once necessary to know what the property cost so that a fair return to the owners may be determined.

A commission's problem in establishing a "fair return" is in reality the determination of a return to a certain industry which will attract capital to that industry, for capital has to be paid for in the "open market" just the same as labor and material.

The Pennsylvania Public Service Commission in making its decision of June 21, 1923, fixing the street-car rates in Philadelphia, had before it the figures given in the table at the top of the next column.

The commission's decision reads in part:

"1. We do not find it necessary in this proceeding to arrive at a final determination of the present fair value of the property of the company. However, our consideration of the items of evidence before us, including the questions of depreciation and going concern value and of matters in dispute between the company and the city, lead us to the conclusion that

Cost of Reproduction New as of June 30, 1919

		Company's estimate	City's estimate
1.	Physical, exclusive of engineering and overheads	$170,756,696	$145,274,250
2.	Engineering	6,787,377	5,810,970
3.	*Organization prior to construction*	2,500,000	2,000,000
4.	Administration and legal	5,976,484	5,084,599
5.	Taxes	1,650,000	800,000
6.	Interest during construction	22,329,736	15,896,982
7.	*Loss of fair return—first year*	15,013,644	.....
8.	Working capital	4,740,374	3,755,414
9.	*Financing (cost of obtaining money)*	22,975,431	8,931,111
10.	Eight items of "overhead"	$81,973,046	$42,279,076
11.	Grand total	$252,729,742	$187,553,326

under established legal principles the present fair value of the company's property is substantially upwards of $200,000,000."

With these figures before it the commission must have taken into consideration these early costs which are encountered in all railroad construction. Frequently these early costs and overheads are lost sight of or forgotten, because (inasmuch as railroads are not now being constructed) they do not attach themselves to items and these items are not easily identified with items of physical property such as a tie, a rail, or a car.

H. E. Hale,
Engineer, Eastern Group, P. C. C.

International

Paris-Calais Boat Train on the Northern Railway (France) Which Makes the 186¼-Mile Journey in 190 Minutes—or 58.8 Miles Per Hour

The Office Building Is a Handsome Structure Fronting on Alameda Street

New Freight House Provides Special Service

Union Pacific Terminal at Los Angeles Meets Requirements of Modern Traffic Conditions

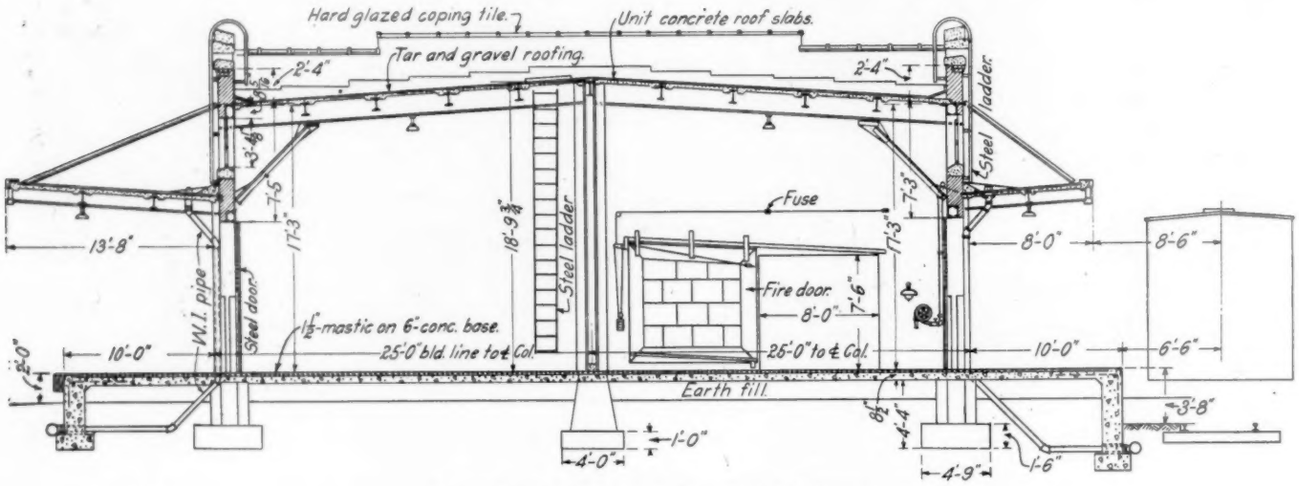
A SPECIAL BUILDING AND PLATFORM for the unloading of automobiles and motor trucks, roadways in a team yard well paved and of ample width to accommodate the largest auto trucks and a 50-ton scale of sufficient length to weigh a truck and trailer simultaneously, are special features of the new local freight terminal of the Union Pacific on Alameda street, Los Angeles, which have been provided to meet modern traffic requirements. The principal features of the terminal is a new modern freight house designed to allow adequate opportunity for future expansion to meet the rapidly growing business of the southern California city. It replaces an old freight station at Meyers and Aliso streets, which has been abandoned, except for use as a team yard, in favor of the new site, because the new location is much more convenient to the wholesale, retail and industrial districts of the city. The growing business in automobiles and trucks for consignees who do not maintain their own on-track warehouses, amounting to from 300 to 350 carloads a month, pointed to a distinct need for facilities of a more comprehensive nature than mere platforms designed for the end and side unloading of cars together with inclines for running the vehicle to the street. Accordingly, provision has been made for a large unloading dock and house as mentioned above. Trackage arranged for the freight house, automobile platform and team yards provides standing capacity for about 250 cars.

Unusual Attention Was Given to the Architectural Treatment of the Scale House

The Roadway Side of the Freight House Is Provided with a Broad Platform Well Protected by a Canopy

The ultimate plan for the freight house calls for a building of "U" shape with parallel inbound and outbound houses

separated by a space sufficient to accommodate six house tracks and a central platform, and connected at the inner end by an office building facing on Alameda street. In the initial construction, this plan has been carried out to the extent of building the office building and the inbound house, which fronts on Hunter street between Alameda and Lawrence streets. This unit of the freight house is now being used for both inbound and outbound business, but owing to the preponderance of inbound freight, only about 30 per cent of the space is required for the outbound business.

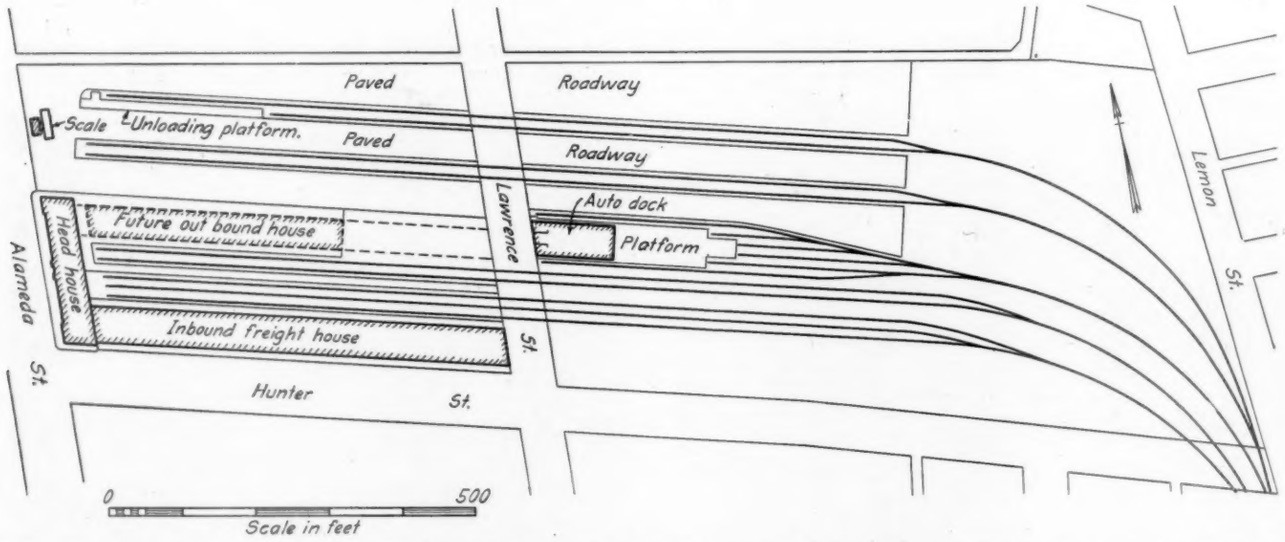


Cross-Section Through the Freight House

The office building is a handsome structure as may be noted in the photographs. The walls are of dark red rough faced brick with recessed joints ornamented with a terra cotta trim and surmounted by a roof of red Granada tile. The interior framing consists of steel columns and girders with wooden floors and timber roof trusses. The interior is finished in Douglas fir with steel sashed windows and maple floors.

The first floor is arranged with a commodious corridor and lobby along the street front with an entrance at the center. Counters extending along the major portion of this corridor afford ample space for the conduct of the office business of the shippers, consignees and cartage men. The remaining space on this floor is devoted to general offices and offices for the agent, assistant agent and foreman and for the agents of several trucking companies. The second floor provides for the clerks, storage space, toilets and locker rooms, including such accommodations for freight truckers for whom a stairway provides convenient access from the freight house. The basement is largely used for record storage, being reached by an elevator that opens into the freight house so as to provide convenient access for records sent in from stations along the line.

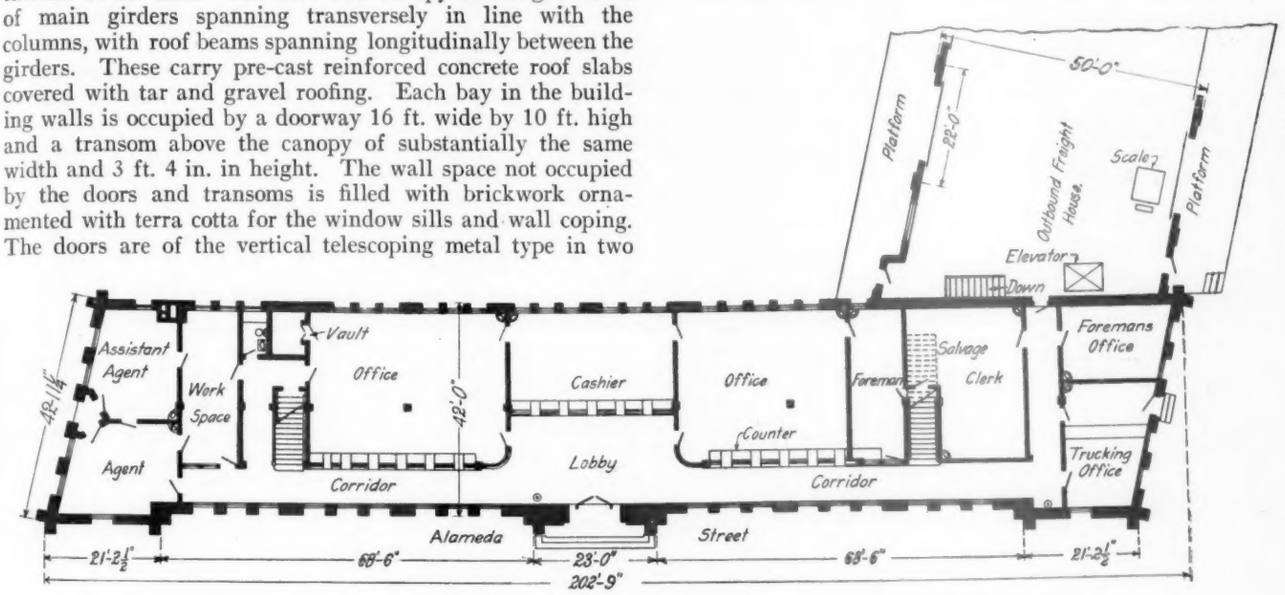
The freight house is 50 ft. wide by 564 ft. 9 in. long with 10-ft. platforms along both sides covered with canopies 8 ft. wide on the track side and 13 ft. wide on the roadway side. These platforms not only obviate the necessity for spotting either cars or street vehicles but are especially valuable on the roadway side in keeping the teamsters and truck drivers out of the house. The freight house has a 6-in. concrete floor on earth fill and covered with a 1½-in. mastic coating. This floor is continuous transversely from edge to edge of platforms where 16-in. walls are provided to retain the fill on which the floor rests. The superstructure of the building is supported on concrete pedestals resting on natural foundations three feet below the track level.



Map Showing the Relation of the Headhouse, Freight Shed and Automobile Dock to the Team Yard in the New Los Angeles Freight Terminal

Steel Frame with Concrete Roof

The building has a steel frame arranged for a transverse bay spacing of 22 ft. and providing three rows of columns, one along each side of the building and one on the longitudinal center line. The roof and canopy framing consists of main girders spanning transversely in line with the columns, with roof beams spanning longitudinally between the girders. These carry pre-cast reinforced concrete roof slabs covered with tar and gravel roofing. Each bay in the building walls is occupied by a doorway 16 ft. wide by 10 ft. high and a transom above the canopy of substantially the same width and 3 ft. 4 in. in height. The wall space not occupied by the doors and transoms is filled with brickwork ornamented with terra cotta for the window sills and wall coping. The doors are of the vertical telescoping metal type in two leaves, the upper one consisting entirely of metal sash. The transoms are equipped with metal sash glazed with wire glass.



First Floor Plan of the Office Building in Its Relation to the Outbound Freight House

The freight house is divided into three main rooms by transverse brick fire walls 13 in. thick, each pierced by one doorway 8 ft. square protected on each side by a galvanized iron-clad, automatic fire door. The room adjacent to the office building is used as the outbound house and the other two as the inbound house. The outbound house has four, four-ton scales with 5-ft. by 7-ft. platforms. The inbound house has four scales of this size and three with 7-ft. by 9-ft. platforms. There is also one 10-ton scale. Each scale is equipped with a weightograph supplied by the General Automatic Scale Company, St. Louis, Mo., a device which displays on an illuminated ground glass a magnified image of a small part of a movable dial, thus insuring rapid, easy and accurate reading of the weight.

The last panel of the inbound house at the Lawrence street end is partitioned off to provide an additional toilet room, a refrigerating room with a capacity of about one car load and a cooper shop. There is also a vestibule for an entrance from Lawrence street. Artificial illumination is provided in the freight house by two longitudinal rows of ceiling lamps, one attached to each cross girder at mid span.

Interior of the New Freight House Demonstrating the Excellent Natural Lighting

The platforms are illuminated by two ceiling lights in each panel, attached to the underside of the canopy.

Complete Facilities in Auto Dock

The automobile unloading platform fronts on Lawrence street almost directly opposite the end of the freight house. It comprises a covered platform 250 ft. long by 50 ft. wide,

of which 100 ft. at the street end is inclosed in walls pierced along the track by openings equipped with Wilson rolling doors. The exterior treatment of the building conforms to the general details of the freight house, having brick walls with concrete lintels. The roof is supported on wooden trusses with platforms of concrete.

This dock is served by four tracks and offers platform space for the side unloading of 10 cars and the end unloading of four cars. Facilities are provided to supply automobiles and trucks with air and water. There is also a 10-ton platform scale and ample space is available for doing whatever work must be done on the cars before they may be run on the street, the entrance at the street being provided with an incline for this purpose. Adjacent to this entrance, office space is provided for a clerk, together with locker space for the records and equipment belonging to the various consignees who receive autos or trucks regularly.

One of the most complete and well appointed features of the terminal is the team yard, which is provided with access from both Alameda and Lawrence streets. Roadways 55 ft. wide, measured from center to center of tracks, insure ample width for the spotting and turning of motor trucks and a concrete pavement with an asphalt top gives the team yard a finished appearance not generally associated with such facilities. One feature illustrating the completeness of the arrangements is the depressed track provided with a platform on one side for the handling of heavy machinery, with a raised roadway on the other side for the accommodation of low platform trucks or wagons. Another accessory to the terminal that is of special note is the large capacity truck scale. As mentioned previously this has a capacity of 50 tons and a platform length of 42 ft., thereby offering opportunity for weighing a motor car with a trailer simultaneously. The platform is finished with an asphalt surface like the pavement and is served by a weigh house or office having an exterior appearance that conforms to the architectural treatment of the office building which is located nearby.

This freight house was designed and constructed by the engineering department of the Union Pacific system. John Parkinson and Donald B. Parkinson, Los Angeles, Cal., were the architects for the head-house. The total expenditure for this project was in excess of $1,000,000.

Savings Made by Remote Operation of Switches

SIXTEEN PROMINENT RAILROADS have saved in one year no less than $523,663 by the installation of power switch machines to be operated at a distance; this by enabling heavy trains to enter side tracks without being stopped for the purpose of having switches thrown by hand and also, in some cases, by the consolidation of interlocking plants. This and other interesting facts in this connection will be found in the report of committee No. 1, W. M. Post, chairman, which has just been circulated by the secretary of the Signal Section of the American Railway Association, preparatory to the meeting of the Section which is to be held in New York City on November 14. The committee sent inquiries to a large number of railroads and received 70 replies; and the 16 roads, whose experiences are summarized in the committee's report, had 82 installations of power switch machines. Four railroads are now making eight installations. The 16 roads reporting are the following:

Atchison, Topeka & Santa Fe.
Canadian National.
Chesapeake & Ohio.
Chicago, Burlington & Quincy.
Chicago, Rock Island & Pacific.
Grand Trunk.
Great Northern.
Louisville & Nashville.
Missouri Pacific.
Nashville, Chattanooga & St. Louis.
New York Central.
New York, New Haven & Hartford.
Norfolk & Western.
Pennsylvania.
Philadelphia & Reading.
Southern Pacific.

The total cost of the 82 installations was $504,102, making the average cost per installation $6,148. Other averages shown are:

Train stops eliminated per year	180,879
Average number per day per installation	6.04
Minutes saved per stop—average	14½
Train hours saved per year	43,652
Tons of coal saved per year	70,656

The report of the committee embraces the results of an elaborate study of the cost of operating outlying switches under four different arrangements: 1. Where every train must be stopped and have the switch set by a trainman; 2, a facing switch, 5,000 ft. from the nearest station or signal cabin with a local switch tender, who must have a shanty and the switch to have an electric distant signal; 3, a similar switch with home signal and approach locking in addition; 4, a similar switch with regular mechanical interlocking, operated by a signalman.

The estimated annual cost of these different plans varies from $7,300 where there is no attendant (and no special apparatus) to $5,467 under scheme 2; and the first cost of apparatus under schemes 2, 3 and 4 would be from $1,800 to $7,308. As contrasted with these estimates, a complete scheme, with remote operation, would cost, for installation $11,192; with an estimated total annual operating cost of $2,397. The average cost per installation ($6,148) shown above as made up from the data returned by the railroads, differs from this estimate of $11,192 by reason of the difference in cost of material and labor at different places and times, and also because some installations are less complete than that on which the committee bases its estimate.

The details of the reports from the railroads are tabulated by numbers, not by names of roads, the road making the greatest saving being put at the top of the list. In the 82 installations, there are 124 switch machines, one road having 10 installations, 15 machines; another 11 installations, 23 machines; another 32 installations, 37 machines; and the others smaller numbers. The estimated time saved per train stop varies from five minutes on road No. 4 to 20 minutes on road No. 15. The savings are made up of (a) time of trains, in hours per year, (b) tons of coal per year and wages of men, other than trainmen. The estimates of the number of pounds of coal saved per stop varies from 300 to 1,400.

The cost of installation of apparatus per plant, varies from $14,848 to $3,500. The net amount saved per year, per installation, after deducting annual charges, varies from $22,879 to $709.

The road showing the largest gross saving per year is No. 11, which had in operation 37 machines; total gross savings per year $136,498, of which $107,255 represents coal.

On this road the average cost of installation of apparatus was $5,471 and the estimated net average saving per installation $3,718.

From notes shown with the table, it appears that on one road there is a switch machine two miles from the point of operation. In another case, the switch operator is a crossing watchman 250 ft. from the switch. One road, in reporting its savings, includes nothing except that due to the use of less coal, as train crews are paid on a trip basis. One road, consolidating interlocking stations, saved the wages of 33 operators who were released for other work.

IN GREENVILLE (Pa.), an evening vocational school has been opened at the Penn High School in which, among other things, a course in the maintenance of railroad equipment is offered. F. M. Ahearn, general foreman for the Bessemer & Lake Erie at Greenville, is instructor. A vocational school class for machinist's apprentices is meeting in the B. & L. E. shops for practical instruction.

Railroad Valuation: A Statement of the Problem*

Must Be Not Merely Determination of a "Rate Base" But Ascertainment of True Value of Railway Properties

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IN THE VALUATION of the American railroads, the crux of the question of the theory of value, when reduced to its lowest terms, is the question to what extent the rights of private ownership in railroad property shall be recognized. Or, to be more specific, the question is shall the property, and its value,—that being the economic equivalent of the property—be protected, or is protection to be given not to the property at all, but to an investment in such property, irrespective of the qualities of the property secured by that investment. Stated more briefly the question is whether the Constitution protects the property or its cost.

There can be no question as to what the conception was with which the regulation of public utility property was begun. The property was private property. It was, however, "affected with a public interest." That interest arose through the right of the state to insure that the utility comply with the duties arising from its profession of public service,—the duties to serve all of the public without discrimination with reasonable service and at reasonable rates. But subject to these duties affecting the conduct of its business the property was private property. Since public utility rate regulation began, the courts have always so held, in cases where the issue has arisen from various angles. The principle was clearly recognized in the case of *Munn* v. *Illinois,* 94 U. S. 113,126. In the *Minnesota Rate Cases* (230 U. S. 352), a serious and careful effort was made to secure the adoption of a contrary doctrine. It was suggested that the carrier performs a function of the state, and that its roadway is public and like a public highway. Original cost was therefore urged as a substitute for value. But the United States Supreme Court repudiated the contention. It said: "The property is held in private ownership, and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law."

With the rights of the owners in private property clearly recognized, the early decisions in which the valuation doctrine found first expression in cases involving rate regulation, were concerned with the constitutional protection of that property. Where private property was condemned and taken as an entirety, it was already established that the Constitution required that its value be paid in compensation to its owners. By analogy, express or implied, it was held that where the issue was whether such property was taken by an act prescribing rates unduly low, the test under the Fourteenth Amendment, as in condemnation cases, was whether the utility was deprived of the value of the property. The development of the doctrine in rate regulation cases was a natural step from its expression in condemnation cases. It found early expression in the case of *Reagan* v. *Farmers' Loan & Trust Company,* 154 U. S. 362, 410, and in the decision of Justice Brewer in *Ames* v. *Union Pacific,* 64 Fed. 165. It found complete expression when the latter case came before the Supreme Court in the case of *Smyth* v. *Ames,* 169 U. S. 466, 535, where the Court held that the basis of regulation must be the fair value of the property used in public service, and said:

"What the company is entitled to ask is a fair return upon the value of that which it employs for the public convenience."

The Smyth-Ames decision was rendered in 1898. Its doctrine has been frequently reiterated by the United States Supreme Court without amendment. The first railroad cases in the Supreme Court subsequent to 1898 were the *Minnesota Rate Cases,* (230 U. S. 352), decided in 1913. The doctrine was there reiterated and explained. From the language in these various decisions and considering the circumstances under which the doctrine developed, it is clear, I believe, that the court held and intended to hold, that since private property was to be protected in cases of rate regulation by insuring a protection of its value, as in a case of condemnation, that value as in a condemnation case, was its economic equivalent, that is, what it was worth, its true value in the economic sense, the price at which it would exchange between a willing buyer and seller. As the measure of the *property,* which could not be taken from the owner, there was prescribed its economic equivalent as of the time of the attempted taking, so that the owner might be kept whole, as in a condemnation case. That value was necessarily a question of fact.

Valuation Not a "Mere Cost Figure"

The court held that the value is not to be determined by the adoption of a mere cost figure or an arbitrary cost rate base, not calculated to reflect, and irrespective of, the peculiar worth of the property, and therefore not its true economic equivalent. The judgment is to be a conclusion of fact as to the true value of the property, such as a jury is required to make in determining just compensation where land is condemned. The conclusion is to be derived by the same processes. The theory contemplates that the determination of value is to be under the same principles in different kinds of cases where value is determined for different purposes.

The matter received most careful attention in the *Minnesota Rate Cases.* In that case the Attorney General of the State of Minnesota presented the matter at length and insisted that the valuation should be determined upon the basis of the *bona fide* investment. It was contended that a railroad property is not like ordinary private property, that the railroad performs a function of the state, that the creation of highways is a function of the state and that a railroad is a public highway. It was argued that the railroads had received as donations from the public certain lands, and that in any controversy between the railroads and the public as to reasonable rates, these items should be excluded from consideration. The United States Supreme Court answered these contentions.

The court stated, in language which has already been quoted, that "the basis of calculation is a fair value of the property used for the convenience of the public," that the carrier could not be limited to the amount of the actual investment, nor could it be protected in its actual investment if that investment were too high, and that the property being held in private ownership, its value and not its cost, was the controlling consideration. The natural measure of the property was its economic equivalent, its value. The measure of cost was rejected because it is a matter of every day experience that there is frequently no close relationship between the value of property and the amount invested in it, or its present or original cost. The basis of most of the transactions in

*This article consists of extracts from an address delivered by Mr. Craven before the Public Utility Section of the American Bar Association, at Minneapolis, Minn., on August 28, 1923.

the business world is the margin between value and cost, or the margin between values as of different times. The theory of the court was that the question of what the property was really worth, therefore, should be determined as that question commonly is determined.

In the ordinary case of a water or a light utility, it has not been unreasonable to use as the measure of the value—(the kind of value set up as a standard by the Smyth-Ames case, —the economic equivalent), the cost of the original or of a present day construction of the property. The element of competition is ordinarily so slight and the qualities of the property not reflected in cost are so few, that the cost of the property may properly be a predominating consideration in determining its value. And in fact in the great majority of cases the cost method has been employed, with individual variations as to detail not important for our present consideration. The value thus determined is usually not widely divergent from the original cost. In a large percentage of transactions in the business world, the value of property is measured by what is paid to produce it, and while that price is admittedly no criterion where the thing acquired is not necessary or suitable for its purpose, or where it does not economically or satisfactorily function in its intended use, yet where it is properly adapted to its purpose, we ordinarily have no hesitation in accepting cost as a controlling evidence of value. The cost of production or construction with an adjustment for depreciation, in the absence of other controlling circumstances, is ordinarily accepted as the *prima facie* value of such property as buildings, ships, wharves, machinery, and a great variety of properties and products.

Problem Presented Unlike That of a Public Utility Monopoly

Let us examine the nature of the ordinary railroad, having in mind the valuation problem which it presents. As I have suggested, it usually is totally unlike a water or light monopoly. It operates in a competitive field under a reasonable rate schedule fixed for all of the roads in that territory. It is an axiom of economics that where competitive forces act freely, value is the result of the forces of supply and demand. The true value of such a railroad depends primarily upon the demand for its transportation service, the extent to which in competition with its rivals it can supply that service, and the economy with which it can do it.

In any rate territory, as has been frequently stated by the Interstate Commerce Commission in its decision of rate cases, rates cannot be based upon the value of each particular road allowing to it only a fair return upon that value. The rates charged by different railroads in given railroad territories are the same, or they have a definite relation to each other, irrespective of the cost of the property of any particular carrier and irrespective of the ratio which net earnings under such rates bear to the cost of any particular carrier's property. Thus in numerous cases it has been held that the fact that a rate schedule permits a large return to certain of the roads, and a scant return to others, does not prove that the schedule is improper. It has been held also that the same rates must be fixed for the entire territory. Under a schedule of rates thus fixed, it will always occur that certain roads, primarily because of their location, will be able to handle more traffic and at a greater profit than others, and there will inevitably emerge certain differentials of value because of the possession by certain roads of certain qualities and potentialities which are the very crux of the question of their economic value.

These differentials will be indicated by differences in earnings, which are the evidences of the existence of certain elements of value. The earnings themselves are not the cause, but the effect, of value arising from qualities inherent in the property. These are qualities resulting largely from location. They exist because of factors dependent on location such as the density of population, the number and diversity of industries, the productivity of the territory served, the relationship of the carrier's line to centers of population and industry, and the location of the carrier's terminals in cities. Factors of that sort affect the demand for the carrier's facilities and the economy and efficiency with which the demand can be served. Certain of the factors of location are reflected in the degree of the efficiency and economy of operation, such as the relative directness of the carrier's route, the gradients, the amount of curvature, and a great variety of physical conditions and qualities arising from the nature of the country traversed, and its topographic, climatic, and other conditions.

These qualities and factors are numerous and complex. None of them is directly reflected in construction cost. They determine the relative earnings of the various roads. As the result of the varying degree in which they exist in the various roads in any group, the roads find their respective places in a scale of earning capacity. The roads ordinarily will hold those respective places in that scale, whether the general rate level of the group goes up or down. These differentials arising from location are qualities of the property. It is important to notice that they are in nature substantially like the qualities of town lots or farm acreages, decisive of their value, and comprised by the title to such private property. They are not comprised by the orthodox conceptions of "going value," or "cost of development," as those elements have been defined by courts and commissions. Nor are they of the nature of the so-called "intangible values." They are no more intangible than the value attaching to a town lot because of its location. These elements of value are not "other values and elements of value," in addition to, and differing from, any so-called "structural value" of the carrier's structural property. The value of a railroad cannot be thus dissected. The value of the structural property depends primarily upon these differential elements.

Under these circumstances, although the approach to value in the case of a monopoly may properly be through the avenue of the sacrifice by which its property is secured, the approach in the case of a railroad, largely because of the competitive conditions and these differentials arising from location and not reflected in cost, must be through a consideration of the economic utility of the property secured by the sacrifice, rather than by a consideration of the sacrifice. The value of individual railroads we know has not been necessarily proportionate to the investment in the property.

The author then reviews the positions of the carriers, the states, the railroad brotherhoods and the Bureau of Valuation with reference to what value is and concludes that the Commission when it came to decide the question adopted the theory that true value is not to be determined but that the value found is to be a fair value for rate purposes which is not value at all. The discussion then proceeds:

All parties appearing, other than the carriers, adopted this position that real value should not be ascertained,—the individual states, the national association of state commissioners, the railroad brotherhoods, and the Commission's Bureau of Valuation. They varied somewhat as to "what is fair," but all agreed that the "value" found was to be a cost figure.

Commission Adopts Cost Theory

The Commission, when it came to decide the question, apparently adopted the theory just discussed. The Bureau of Valuation, in fact, makes no careful investigation of the inherent qualities of a railroad from the standpoint of the economic value of its property. Its investigation, so far as data usable in determining value is concerned, is largely restricted to engineers' investigations of reproduction cost, accountants' statements of investment and income accounts, and land appraisers' estimates of land values (based on the

value of the land for other than railroad purposes). Up to the present time, the Commission has not rendered decisions explaining its action.[1] It has issued three hundred and twenty-nine tentative valuations in which there is a finding of "final value" designated as "for purposes under the Act to Regulate Commerce," this being obviously intended not as a determination of real value, but a determination of a rate base on a basis of cost. The aggregate value found for such properties was $2,898,000,000. An analysis of the figures shows that a cost formula has been generally employed although the same formula has not been applied in every case. In a very large number of cases, and in so great a number that obviously it is not by mere coincidence, it occurs that the addition of the cost of reproduction less depreciation, and the acreage value for non-railway purposes of the land, together with a sum which is 5 per cent of the preceding two amounts, will produce a figure, to which the "final value" (reported in *round* figures) is very close. Taking the 329 tentative valuations as a whole, the final value found is 5.6 per cent in excess of the aggregate cost of reproduction less depreciation and land value figures. Speaking generally, a cost method has been used for all railroads with no regard for their relative productivity, or the existence or non-existense of the qualities which determine value in any true sense. Where there has been any variation from the rule of adding 5 per cent, it does not appear that it has been because of any effort to ascertain the true economic value of the property.

What is the effect of the recapture of earnings, where the "value for rate making purposes" upon which the reasonableness of the earnings is determined, has been fixed on a cost basis such as the commission uses, or on any other cost basis such as a prudent investment? Our minds reason best in a consideration of concrete cases. The following examples serve to illustrate several phases of the situation. It may well be borne in mind in considering these cases, that it is of course not material in discussing the recapture from a constitutional standpoint, that it requires the taking of only half of the earnings in excess of the designated return. If half can be taken, all can be taken.

Case 1. Two men purchase business lots for the same price on different streets of the same city. Business development greatly increases the utility of one of these lots and its economic value, but not of the other. That increase belongs to the owner. It is clear that any statute which, on the basis of the original investment in the two pieces of property, would deprive the owner of the better lot of the increased revenue due to its superior location, thereby virtually making it equivalent in value to the poorer lot, would destroy that differential increment in value due to the advantage of location. Such an appropriation would violate established conceptions of rights in private property. This is merely an illustration of the so-called "unearned increment."

Cost Theory Disregards Value Due to Earning Capacity

Case 2. Assume the ordinary case of a competitive railroad operating under a schedule of rates fixed for all the roads in its territory or group, on the basis of a cost valuation of the railroad property in the group, as fixed by the Interstate Commerce Commission under the Transportation Act. The particular railroad in question, because of physical and other qualities of its property due to its location (as for example, its superior route secured in early days by which it avoids grades and tunnels, its location with reference to centers of population, and trade routes, and its efficiencies in construction and operation), develops a superior degree of usefulness and economy. These qualities are incidents of the rights in private property. They are independent of cost. They can no more be measured in terms of cost than the difference between the two business lots mentioned in Case 1. This road may earn 12 per cent on its prudent investment, or on a so-called "value" determined on a cost basis such as the Commission has employed, leaving 6 per cent subject to recapture and restraint. A determination of such a value on a basis of cost, which is not value at all, and not the property's economic equivalent, but determined without a consideration of these qualities, necessarily effects a deprivation of them, if the recapture is employed. These two cases illustrate clearly, that increments in value in railroad property, of a character exactly similar to increments in value in other private property, are destroyed, and such elements of advantage as arise from location are confiscated, if a value is found on a basis which is other than that suggested by a proper interpretation of the case of *Smyth* v. *Ames*. The problems illustrated by these two cases are on an exact parity from the standpoint of economics. The problem in the case of the railroad is merely the old problem of the so-called "unearned increment" in land. It is disguised here in a new form.

Case 3. A railroad operates in the southwestern deserts where there is great difficulty in obtaining engine water. The road is earning about six per cent upon a so-called "value" ascertained on a cost basis. It then succeeds in perfecting its claim to a water right, which it acquires for $100,000, that being its value for non-railroad uses. The possession and use of this water right enables annual savings which capitalized produce a figure of $10,000,000. The "value" found on the cost basis will be increased only $100,000. Thus the very great part of the value produced by the ownership of this water right is subject to recapture or restraint. The water right is private property. If on the other hand, in a desert area, one rancher appropriates a water right and thereby makes his desert ranch "blossom as a rose," while his neighbor is not successful in his appropriation of water, we would hesitate to attempt through any legal process to limit the earnings of the two owners to the original investment in the desert land, without consideration of the value of the water right secured by appropriation and substantially without cost.

The following conclusions can be drawn under these circumstances:

1. If the value protected by the Constitution is not value in an economic sense (that is the economic equivalent of the property, reflecting its peculiar conditions and qualities arising from its location), a recapture of earnings under the provisions of the Transportation Act constitutes a confiscation of the property. The superior location is taken away. The recapture is an appropriation of the property rights in the physical property,—arising from its location and attributes, and is an appropriation on an exact parity with the taking of the so-called "unearned increment" in the city lot, or the water right on the desert ranch, due to the location and attributes of that property. A cost figure cannot reflect such attributes. A cost figure therefore does not reflect the *property*. Yet in the *Minnesota Rate Cases*, the Court said: "The property is held in private ownership and it is that property and not the original cost of it which the owner may not be deprived without due process of law." The reasoning of this statement applies not only to original cost, but to any cost, and with equal force.

2. On the other hand, if value is determined as the Court contemplated in *Smyth* v. *Ames*, and as a jury would determine it in a condemnation case (considering "all the

[1] This address was delivered on August 28, 1923. On September 11, 1923, the Commission issued decisions in the case of the San Pedro, Los Angeles & Salt Lake Railroad Company, Docket No. 26 (75 I. C. C., 463), and in the case of the Atlanta, Birmingham & Atlantic Railroad Company (75 I. C. C., 645), Docket No. 4. It appears from these decisions that the "value for rate making purpose" which is reported, is not the true value or the economic worth of the property. It is a finding of a "just amount" determined largely "by equitable considerations" upon which it is "just and right" that the carrier, if possible, be permitted to earn a return (San Pedro decision, pages 504-14, 522, 528, 551-4, 567-9, 576-589; Atlanta decision, pages 672-6). The value found is a cost figure.

relevant facts" as required by the *Minnesota Rate Cases* decision, including all the attributes and qualities of the property), whether there will be any taking of the property through the operation of the recapture provision will depend as a practical matter on the judgment of the commission, court, or jury in fixing the value. Ordinarily it is clear that the earnings subject to recapture in cases of prosperous railroads will be less than if an arbitrary cost figure is determined as the value. Theoretically, the amount subject to recapture will be nothing, and the recapture will be defeated.

3. As has been suggested, the controlling criterion here is whether these attributes of railroad property consisting of these differential elements as between various competing railroads, are such elements of private property that they are to be protected. The fact that a railroad is "affected with a public interest" has up to this time justified its regulation in order to insure the performance of its public duties, but it has not yet been held that railroad property is so out of the category of private property as to justify the appropriation without compensation of those increments of value due to these differentials, which increments could probably not be taken from the owner of the business lots of a city or the ranch owner on the plains, without an overturning of the very government itself. If a theory of value is adopted, under which it is unnecessary to respect the differentials between individual carriers, but under which "value" is to be fixed on an arbitrary cost basis for railroads, regardless of how conceived, located or operated, a destruction of the rights in private property, like the confiscation of the "unearned increment," is accomplished when the Supreme Court approves that theory of value.

Under these circumstances there are two possible courses which might be pursued. The rights in private property may be recognized or they may be abrogated. They may be protected by insuring the formation of a judgment by the tribunal as to the true value, as *Smyth* v. *Ames* contemplated, which will fully protect the differential qualities of the property. If such a judgment is thought not practically possible, as the critics of *Smyth* v. *Ames* assert, and if the cost method of determination is the only feasible method, then rates should be *made* as a legislative matter upon a basis of cost. But under such a system, the earnings due to qualities inherent in the physical property and not reflected in such cost, should not be subject to recapture, for the use of recapture under such circumstances constitutes a clear confiscation of the differential elements of the property. The two courses just outlined assume that the property of railroads is private property and that it and its attributes are to be protected, either in one way or another. In the event that neither of those courses is adopted, the course which remains is to regard such property as not in the category of private property, to regard its earnings subject to recapture, and not to protect the differential elements of the various railroads. This is what the proponents of the cost theories urge.

If this course is taken the value of railroad property is no longer of any significance. Important rights of private property in railroad holdings are practically destroyed. It will then become the duty of the courts to establish a new constitutional doctrine on a radically different basis than heretofore recognized, and which will insure the constitutional safeguards not for property, but for investments in a property so "affected with a public interest" that it is no longer private property and is therefore subject to regulation on the basis of an equitable treatment of an investment made in a thing substantially divested of elements of private ownership. That this be done has been frequently urged. In what is in effect a dissenting opinion by Judge Brandeis in the recent case of *State of Missouri v. Southwestern Bell Telephone Company,* decided May 31, 1923, this proposition was suggested in the language, "The thing devoted by the investor to public use is not specific property, tangible and intangible, but capital embarked in the enterprise." Such a theory strikes at the very root of the institution of private property. Its exact opposite was stated in the decision in the *Minnesota Rate Cases:* "That property is held in private ownership, and it is that property, and not the original cost of it, of which the owner may not be deprived without due process of law."

The considerations which I have outlined indicate the effect upon property rights, if their economic equivalent or value is not made the basis of rate regulation. A further phase of this matter indicates that if the standard of value intended to be established in the Smyth-Ames case is abandoned, the protection of property rights in railroad property will be practically impossible. This is illustrated by the contentions of the proponents of the substitute cost theory, made before the Interstate Commerce Commission in the course of the federal valuation investigations. Mr. Prouty, Director of the Bureau of Valuation, early in the work enunciated the theory of those who believe that a value for rate purposes must rest upon cost. In the course of the Texas Midland case (that being one of the early cases used for purposes of a clinic), he said that value, as value is concerned in rate controversies, is not value at all, but is a political rather than an economic concept, —a thing, to use his language, which cannot be "defined," but can merely be "described." It is "an amount of money" upon which it is "just" and "reasonable" that the utility be entitled to earn a return. The problem, as thus defined, is to ascertain "what is fair."

This conception lacks any element of scientific or legal exactitude. "What is fair and reasonable" is all things to all men. That the doctrine is destructive of rights in private property is demonstrated by the contentions which have been advanced under it by certain of its proponents. These contentions are that recognized property rights shall not be protected because it is not "fair" to protect them. For example, it has been contended before the Interstate Commerce Commission, in the determination of a so-called "value" under this theory; first, that lands or other property owned by the carrier and devoted to public service, but which were donated to it, should be excluded from the valuation because it is not fair that the public should pay a return on such property because donated by the public; second, that the original cost of the lands should be the basis of determination, instead of the present value, because it is not fair that the carrier receive a return on the unearned increment; third, that there should be no recognition of the element of value, known as appreciation, adaptation, or solidification of a road bed, because such condition, although admittedly an element of value, accrues in part as the result of work charged to operating expenses which is said to have been "paid for by the public," and upon which it is, therefore, said not to be fair to charge the public a return; fourth, that in cases where a company has owned a logging railroad and the investment in which has been largely amortized from earnings, the public should not be charged a return upon the full value thereof, when the railroad subsequently is devoted to a common carrier business, it being unfair to do so, because the carrier has amortized its original investment; and fifth, that where additions and betterments to the physical property have been charged to operation or surplus, as for example, where bank widening has been charged to ordinary maintenance, such property should be excluded from the valuation because charged to operation and therefore "paid for by the public." In each one of these instances the doctrine of "what is fair" is advocated as a means of depriving the carrier of a return upon what is unquestionably its interest in private property, thereby removing such property from the category of private property. Since "what is fair" or "reasonable" is a matter susceptible of no definition, and finds no actual

definition in any authoritative statements of legal or economic principles, the standard, as a standard of the measurement of the protection of property rights, is not a standard at all. It makes the protection of those rights entirely a matter of the individual conscience of the tribunal charged with the determination. The doctrine practically makes the commission free to adjudicate legal rights without direction of legal precedents. To use the language of the *Minnesota Rate Cases,* such property is then "at the mercy of legislative caprice" if the courts approve that theory of valuation.

Fair Regulation Versus "Near-Confiscation"

[After calling attention to the fact that the Supreme Court in decisions decided in the last few months indicates its intention not to abandon the Smyth-Ames doctrine, the discussion proceeds as follows:]

The problem of the making of rates as a legislative matter is distinct from the problem of testing rates as a constitutional and judicial matter. The two fields of inquiry, and their respective standpoints, are entirely distinct. The court in reviewing legislative action must, and does, in its deliberations, exclude questions of public policy. On the other hand it is the very function of the legislature to determine matters of policy. The distinction between a rate base (as a means of rate making by a legislative agency) and value (as a means of rate testing in a confiscation case by a court), has been frequently, and is ordinarily overlooked. This confusion has produced seriously unfortunate results in the regulation of public utilities, because it has meant regulation on a near-confiscation basis. The legislative branch of the government, or its agency, a regulatory commission, can establish reasonable rates on any basis whatsoever, and even without any consideration of value at all, except that such legislative action is subject always to the constitutional restriction preventing the establishment of rates so low as to effect confiscation. The standard fixed by the constitutionally protected value is an irreducible minimum. It marks merely the lowest limit. The commissions, however, have felt bound to apply, in the exercise of legislative functions, this bed-rock criterion of the judicial conception of value derived from opinions in confiscation cases. The distinction thus forgotten has been recognized repeatedly by the courts although it has not been ordinarily observed by the commissions. There is an excellent discussion of this point in the case of *Waukesha Gas & Electric Co.* v. *Railroad Commission of Wisconsin,* decided July 25, 1923, by the Supreme Court of Wisconsin. The distinction is also recognized in the case of *Galveston Electric Co.* v. *Galveston,* 42 Sup. Ct. Rep. 351, and in *Southwestern Bell Telephone Company* v. *Public Service Commission,* decided by the United States Supreme Court on May 31, 1923. In the Galveston case, it is said that important elements of cost, such as development cost, may properly as a matter of policy be considered in making rates, but cannot be considered in a confiscation case, since they do not reflect value. The same doctrine would seem to apply, in determining a rate-base for making rates, in the treatment of many other elements such as bond discount and depreciation.

The results effected by this unfortunate confusion are illustrated by the federal valuation work where the commission's determination of value has rested on the basis of precedents in confiscation cases. The value determined purports to be the value there defined. The cases cited in briefs of counsel are entirely of that character. The Transportation Act, however, requires the making of rates which, at the time of the enactment of the statute, were to return 5½ per cent on the value, this being in 1920 and at a time when liberty bonds were selling on a basis in the open market which would net the purchaser about 5 per cent. Since that time carriers whose credit was of the best, have refinanced bond issues with money costing above 6½ per cent. Rates intended to produce such low rates of return are fixed under a provision of the Transportation Act which in terms requires making of such rates "in the exercise of its (the Commission's) power to prescribe just and reasonable rates." This enactment as administered by the Commission thus produces a situation in which the entire distinction between *reasonable* rates as determined by a legislative agency in the exercise of its rate-making power, and *compensatory* rates as determined by a court in a confiscation case as a matter of judicial determination, is overlooked. This is because the rate of return as fixed by the Act is probably below the level which a court would regard as proper in a confiscation case, whereas the value is determined on the basis of bed-rock precedents established where the issue is the judicial issue of confiscation. The Interstate Commerce Commission has perhaps felt itself constrained by the provisions of the Transportation Act which do not recognize these essential distinctions, and which contemplate that rates shall be made upon the same basis upon which the test of recapture depends. The Commission's action depends upon legislation which does not observe certain necessary distinctions.

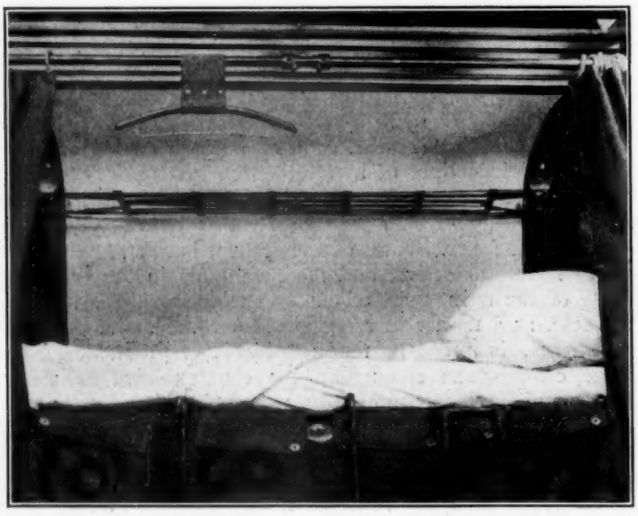
In an earlier part of this discussion, it was suggested that the property of the railroads might be protected, as required by law, either by making rates on the basis of the true value of the property, as fixed as the case of *Smyth* v. *Ames* contemplates, or by making rates for the group on a cost basis for the railroads comprising the group, in which case there should be no recapture of the earnings of an individual road in excess of a fair return on the cost of its property. Under the present conditions, as a practical matter, the Commission ought to follow the second of these two methods. Although this work was begun in 1913, the Commission has not determined, and its investigation of the railroads probably does not afford the data enabling it to determine, the true economic value of the property of each individual carrier. Had it properly determined such a value, that value would have afforded the proper basis for the making of rates. Rates need not, however, be made, necessarily, on a value basis. From the standpoint of a proper theory of rate making (as a legislative matter) as distinguished from rate testing (as a judicial matter), it appears that rates for a regional group may properly be made on a cost basis. The railroads of any regional group are like the various lines of a city traction system. The whole traction system is a monopoly. The rates are made for the city as a whole. The whole system is necessary for the service of the city. Parts of the system, however, are necessarily more productive, and more valuable in the economic sense of the term, than others. Considering the system as a whole, as a matter of economics, its value under ordinary conditions, is properly reflected by its reproduction cost. State commissions throughout the country have so recognized, and have determined the value of such properties on the basis of a primary consideration of the present costs of their reproduction. The railroads of a region considered as a group, like the city traction system, are a monopoly. Their value, like the value of a city traction system, may properly be measured on a cost basis. Competition does not operate to destroy cost as a reflection of true value, since the group when considered as a whole is a monopoly. The Transportation Act contemplates the making of rates for groups of carriers. Under these circumstances, and following the precedents of the state commissions in treating the exactly analogous problem, a cost method should be used. Such a basis is economically sound, not only because cost properly measures the economic value of the group, when considered as a group monopoly, but for the further reason that rates made on the cost basis reflect the true present cost of producing the service. This base should be determined

as a legislative matter and on such a basis as to reflect the considerations of policy properly germane to a determination of a legislative character. The problems of policy involved in the fixation of such a cost figure cannot be adequately discussed within the limits of the time fixed for this address, as for example, whether present, or pre-war prices, shall be employed, a question as to which even the United States Supreme Court is apparently somewhat in doubt.

But although the value of the group may properly be determined on a cost basis, and although rates for the group may properly be made in that manner as a matter of legislative determination, and in the establishment of reasonable rates as a legislative matter in contradistinction to the testing of compensatory rates or the issue of confiscation as a judicial matter, yet when the rights of the owners of the property in the individual lines comprising the group are in issue and the constitutional safeguards are invoked in protection of those rights, the recognition and protection of the rights in private property in the respective lines necessitates the consideration of the differentials in location and value naturally existing between them, which are not reflected in cost. A judicial issue then arises. The value of the property, and not its cost, becomes the criterion.

New Shelf for Upper Berths in Pullman Cars

THE RACK ILLUSTRATED has been designed to hold the hand baggage and wearing apparel of passengers occupying upper Pullman berths. The rack is made in 1 in. green belting, or as is sometimes called "boot-leg webbing." It is a skeleton affair, fastened at each end of the partition by means of two hooks. If the passenger does not desire to use this rack, it can be pushed back, as the hooks will slide on the brackets and the rack will fold up against



A Shelf of Heavy Webbing to Replace the Hammock in the Upper Berth

the lower deck headlining. This same practice is followed when the bedding is placed in the berth preparatory to closing it for the day.

Where this rack is used no hammock will be provided in the upper berth. While the hammock was convenient for storing clothing, it afforded no means of handling grips or hand bags, and the use of this rack will permit hand baggage to be conveniently placed in the berth out of the way of the passenger.

International Farm Congress Considers Railroad Problems

RESOLUTIONS demanding immediate reductions in freight rates on agricultural and live stock products and protesting against further wage increases for laboring men until the financial condition of the farmers has been bettered, were approved at the Seventeenth Annual Session of the International Farm Congress of America held at Kansas City, Mo., on October 10, 11 and 12. Delegates were present at the Congress representing the Farm Congress organization and membership, the National Grange, the American Farm Bureau Federation, the Farmers' Union, the American Wheat Growers' Association, the American National Live Stock Association, the American Cotton Association, the National Live Stock Producers' Association, 30 state farm bureaus and granges, 7 agricultural colleges, 87 county or local farm associations, live stock record associations, and delegations appointed by governors of 25 states throughout the country. Some of the resolutions adopted at the session were in part as follows:

"The transportation problem calls for the most earnest consideration of the entire country. We contend that the public welfare will be promoted by the establishment of the lowest practicable freight rates upon the products of the farm. We are told that the carriers cannot stand further rate decreases without a corresponding reduction in wages and other expenses. If this is true, then the national welfare as well as that of the farmers will be promoted by bringing about such reductions. And if general rate decreases cannot be had, a readjustment of the present burdens would seem not only justifiable but imperative.

"The principle of rate classification under which the various articles and commodities pay tariffs based upon their value, bulk and economic importance is as well established as is the industry of transportation itself. A wise application of this principle, in our opinion, calls for a general lowering of the rates on agricultural and live stock products even though such reductions must be compensated for by proportionate increases on goods not so fundamentally necessary to the life of the nation and to the proper distribution of its population. We therefore demand an immediate reduction of freight rates on agricultural and live stock products. We favor the repeal of any guarantee provisions in the present Transportation Act. We favor an equalization of export rail rates to our ports from the Middle West and of import rail rates from all ports to the Middle West."

"We view with apprehension the proposal to force the consolidation of all the railroads in the United States into a few great systems. It is a fundamental principle that the exercise of authority involves a corresponding measure of responsibility. If the people through their government arbitrarily rearrange the transportation system, they cannot escape responsibility for mistakes. In the event of impractical consolidation, the cost of operation would be increased, resulting in higher rates . . . ."

"We reassert our right to participate in the formation of a uniform and settled labor policy. The right of men to organize and to sell their labor collectively is unassailable; but such transactions should always be upon the basis of the value of the service rendered. Organization to secure men their rights is justified. Organization that protects them in unfair practices or irresponsible acts or in dereliction of duty, or that suppresses their ambitions is wrong. We most emphatically protest against further wage increases until the farmers' dollar has recovered its fair purchasing power. We condemn the growing inclination of railroad companies, coal operators, public utility corporations and other large employers of labor to surrender to unreasonable demands for higher wages, passing the cost on to the public."

Passenger Trains Operate on Close Schedule in Train Control Territory

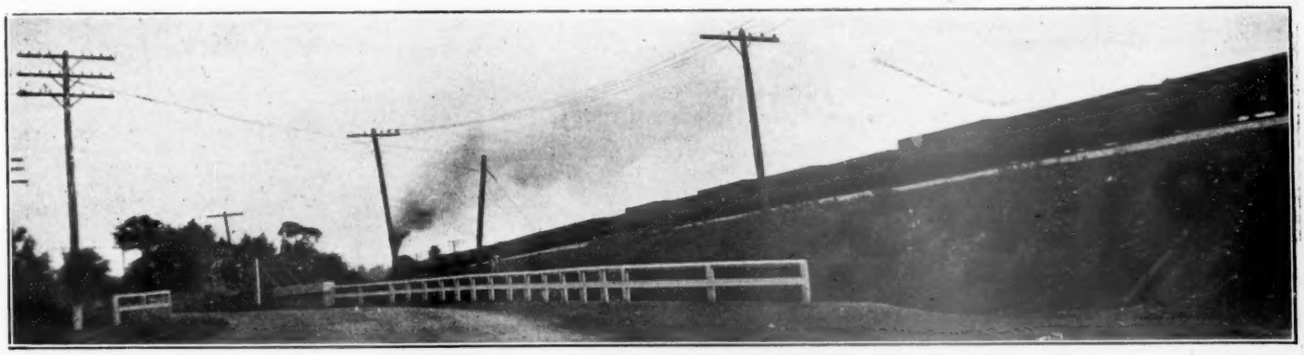
One Railroad's Experience With Train Control

Nine Years in the Operation of an Engine Division on C. & E. I.—Furnishes Interesting Data

IN VIEW of the widespread interest in the subject of train control among railroad officers it is worth while to review the experience over a period of nine years of one railroad with equipment of this kind applied to an entire passenger engine division of 107.2 miles of double track. Its total experience, however, extends over 12 years, since the equipment of the entire division was preceded by a development period of three years. During this time the railroad co-operated with the manufacturer in tests to determine what modifications were desirable before an entire division was equipped. Since then further changes and developments have been made as experience has dictated.

The Chicago & Eastern Illinois, with the most extensive installation of automatic train control at present in service in the world, has had experience with the operation and maintenance of such a device under all weather conditions which have existed in northern Illinois for the above mentioned length of time. Eighty-five engines are equipped with the train stop, and there are 175 indication points in service. During the nine years train control has been in service over the entire passenger engine division there has been a total of 163,044 trains, 83,403 passenger and 79,641 freight, moved in train control territory. In this period, 7,756,479 passengers have been transported safely and 6,079,709,332 ton-miles of freight service rendered.

The Chicago division of the Chicago & Eastern Illinois is an unusually busy section, and train control apparatus is in service on practically all trains operating over it. The density of traffic, wide range of train equipment and variations of speed impose severe operating conditions. In this territory there are 16 carded passenger and 11 carded freight trains each way, or a total of 54 trains operating over all or part of it, not including the extra trains run. The passenger service includes high speed service between Chicago and St. Louis and through service between Chicago, Florida and New Orleans by way of its connection with the Louisville & Nashville at Evansville, Ind. The freight trains range all the way from the way freight to the long drag with a maximum of 110 cars. In addition, a number of fast freights are operated between Chicago and St. Louis and between Chicago, Florida and Louisiana points via the L. & N. and Nashville Chattanooga & St. Louis through the Evansville gateway.



Long Drag Freights Are Handled in Train Control Territory

The diversified commodities handled over train control territory show the character of freight service required. Corn, fruits and potatoes constitute the greatest tonnage of products of agriculture, while cattle, hogs and packing house products make up the heavy shipments under animal products. The largest tonnage handled of any one product is bituminous coal. A heavy tonnage of clay, gravel, sand, stone and brick is also handled. Other commodities affording a large volume of business are lumber and lumber products, refined petroleum and its products, various classes of iron and structural steel and automobiles and trucks.

A better indication of the traffic actually handled in a

typical year in train control territory is given by the information in the table below:

1.	Number of freight trains, loads and empties, including extras moved	8,849
2.	Number of passenger trains, including specials	9,267
3.	Number of ton miles of freight hauled	675,532,258
4.	Number of passengers, both through and local	865,951
5.	Maximum number of cars in freight train	110

Train Control and Operation

From the time the C. & E. I. began experimenting with train control to the present it has been the desire of the management, first through intensive tests and experiments, and later under actual operating conditions, to secure the maximum of protection and operating results with simplicity in design of apparatus and with the least possible interference with traffic, as well as to determine the practicability of such a device in steam road operation. The installation, by reason of its extent as well as its long period of service, has furnished a fund of information on the subject of automatic stops or train control, and the management has satisfied itself of the practicability of such a device functioning properly on high speed passenger trains, and long, heavy freight trains.

Chicago-St. Louis Limited Approaching Ramp at Momence, Ill.

The officers have found that the installation has not limited track capacity and that operating conditions have been bettered, increasing the ability to run trains on schedule and actually to make up time during foggy and stormy weather.

The automatic stop, which is of the intermittent electrical contact type, has had to demonstrate to the satisfaction of the railway's officers its ability to function properly under widely varying weather conditions. The temperature in northern Illinois ranges from approximately 100 deg. F. in the summer to 30 deg. below zero in winter. This section is also visited with heavy snow and sleet storms as well as dense fogs. The records of the weather bureau at Springfield, Ill., show that the greatest snowfall on record, 43 in., fell in the winter of 1913-14, while January, 1918, was the most severe month in the climatological history of Illinois, both for low temperature and heavy snowfall combined with heavy winds. Under these conditions the management had an opportunity to observe how this type of automatic stop would function.

Installation and Maintenance

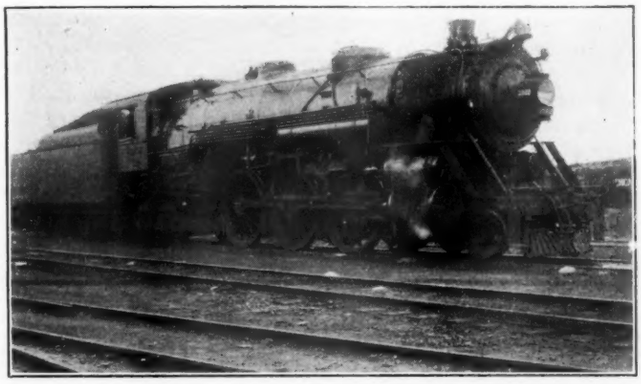
It was the thought of the management that a train control device to be practicable should be of easy application and reasonable in first cost; that the operation and maintenance charges should be low and that it should not interfere with standard roadside clearances. No locomotives have been held out of service because of applying or maintaining control apparatus during all of the years of development and operation. Regarding clearances, engines on the C. & E. I. are not assigned, and it is the practice to run engines carrying control equipment over tracks outside of control territory as well as over the tracks of foreign lines. As an example, engines carrying control equipment operate over the tracks of the Cleveland, Cincinnati, Chicago & St. Louis between Pana, Ill., and St. Louis, Mo., and daily over the tracks of the Chicago & Western Indiana from Dolton, Ill., to the Dearborn street station, Chicago. No serious trouble has been experienced with the engine equipment interfering with roadside clearances. It is of interest to note that the installation of the automatic stop has resulted in maintenance of way forces maintaining better clearances with material such as ties and rail, which are unloaded for use along the track.

The average yearly cost for operation and maintenance is $98.01 per engine and $46.64 per ramp location, as developed from the C. & E. I.'s records. The low cost for maintenance and operation is considered due to the fact that no especially trained men are employed to maintain the control. The regular signal maintainers and track men look after the roadway equipment and the shop mechanics make all repairs on engine equipment along with their ordinary shop work. It was found unnecessary to employ any additional men for this purpose. After the nine years of service, the ramps do not show any appreciable evidence of wear, and but few have been damaged or displaced by dragging equipment. In locating the ramps it was decided to place them at braking distance from the signal, or expressed in another way, they were placed at the point where the engineman would make a service application of the brakes to bring his train under control to stop for the signal.

Train Control Development on the C. & E. I.

W. J. Jackson, then general manager, and now president, had two engines and four miles of track equipped with the automatic stop device of the Miller Train Control Corporation during the spring and summer of 1911. On October 5 of that year a public demonstration was given in the presence

of many railroad officers and other interested spectators. As a result of these tests, the railroad company decided to allow an extension of the installation to be made. The territory selected was from Danville, Ill., to Hoopeston, 24 miles of double track. This installation was completed and put in operation on December 9, 1913, and about 25 freight and passenger engines were equipped and operated regularly during the winter and spring of 1913 and 1914. As a result of the tests conducted from 1911 to 1913 the management decided to allow a further installation to be made over the entire Chicago division extending from Danville, Ill., to Dolton, a distance of 107.2 miles of double track, and 22.7 miles between Hoopeston, Ill., and Watseka was put in operation on July 14, 1914. The installation between Watseka and Momence, 27.5 miles, was put in operation on August 15, of the same year and the district from Momence to Chicago Heights, 23.3 miles, was completed on October 9, 1914. The final stretch of 9.7 miles between Chicago Heights and Dolton was put in operation on November 1, 1914. When the work was completed there were 175 ramp locations in service and 85 engines—38 freight and 47 passenger—equipped with the engine apparatus. The following table is of interest in showing data pertaining to the operation of the device throughout the period of nine years from October, 1914, to October, 1923:



Type of Passenger Locomotive Equipped with Train Control Apparatus

Total number of trains run (freight and passenger)	163,044
Total number of train miles	16,055,073
Total number of control movements	13,002,759
Total number of times each ramp engaged by shoe	163,044
Total number of times each shoe engaged ramp	167,825
Total number of passengers carried	7,756,479
Total number of passengers carried one mile	762,067,575

Locomotives Equipped

	Number equipped
Passenger locomotives—	
Atlantic type, 4-4-2	24
Pacific type, 4-4-2	18
Ten Wheeler type, 4-6-0	5
Total number passenger locomotives	47

	Number equipped
Freight locomotives—	
C. & E. I. Mikado type, 2-8-2	25
U. S. R. A. Mikado type, 2-8-2	13
Total number freight locomotives	38

What the C. & E. I. Has Learned

The C. & E. I. was the first steam road actually to develop the automatic stop to service efficiency on an extended scale, and in this respect is the pioneer in this work. Its officers have satisfied themselves as to the practicability of the device as a factor in preventing the failure of the engineman to interpret signal indications correctly, and have found that it enables the engineman to know the condition of the track at a point the proper braking distance from signals in stormy and foggy weather. Automatic applications of the air on long freights have not resulted in damage to equipment. The officers of the railway felt that for their particular purpose the intermittent electrical contact type was best suited and that the equipment should be of such a character that the regular engine inspectors could quickly determine that all the parts were in their proper places and in good condition.

Another point which the management considered of great importance was that the apparatus should prove itself at each and every indication point, indicating to the engineman that he was approaching a signal and whether the signal was in the clear or stop position. One problem which had to be solved was that of working out the proper braking distance for all classes of trains operated. It has been found during the nine years of operation that the locations as they are at present installed meet the actual service conditions for the average passenger train and for the various classes of freight trains. It has also been found that the engineman's responsibility is not lessened, that automatic train control does not make him careless, and that it does not interfere with the handling of his train as his judgment would dictate.

Freight Car Loading

WASHINGTON, D. C.

REVENUE FREIGHT CAR LOADING during the week ended October 20 showed a further decrease to 1,072,881 cars. This represents the fourth week in which the loading has been less than that for the week ended September 29, which was 1,097,274, which indicates a probability that the latter figure will stand as the peak for this year, unless there should be a considerable increase during the week ended October 27. Last year the peak loading was attained during the week ended October 28, when 1,014,480 cars were loaded, but in most years the seasonal decline at the end of the year has begun somewhat earlier. In 1918 and 1919 the peak was reached in the week ending September 23. In 1920 it was reached during the week of October 14, 1,018,539 cars; in 1921, during the week of October 21, 964,811 cars. If the record for the last week of September stands as the peak for this year it will exceed slightly the estimate made by the Car Service Division about April 1, when a chart was published with a red line showing an estimate of the loading for the balance of the year, based on experience up to that time, which indicated a peak loading for the week of October 20 of 1,085,000 cars. Until recently there have been some estimates that the figures might go far beyond that point.

Loading for the week ended October 20 represents an increase of 83,992 cars as compared with that for the corresponding week of last year and of 108,070 cars as compared with the corresponding week of 1921. Loading of grain and grain products and coal showed decreases as compared with the corresponding week of last year, and also as compared with the corresponding week of 1921.

The freight car surplus for the week ended October 23 showed a further slight reduction to 23,895 cars, including 15,974 box cars and 5,674 coal cars. The reported shortage also showed a reduction to 13,655 cars, which included 4,317 box cars and 3,250 coal cars.

The railroads on October 17 moved more freight cars—that is both loaded and empty cars—than ever before on any one day. Fifty-two Class I roads, representing about 90 per cent of the mileage for that class of carriers, on that day moved 1,029,428 cars. The significance of this performance can be realized more readily when consideration is given to the fact that this represents approximately one-half of the total number of freight cars owned by the railroads of the United States. The best previous record was made on September 26 when 1,013,724 cars were handled.

In 1920 when, except for this year, more traffic was carried by the railroads than ever before, the peak movement of both loaded and empty cars was 947,098, which was reached on October 28 that year. But even that record, which stood until this year, has been exceeded four times since August 29, 1923.

It is this stimulation on the part of the railroads in the handling of both loaded and empty freight cars that has resulted in the carriers this year being able to move the greatest amount of freight on record with virtually no car shortage, while at the same time there has always been a supply of surplus freight cars in good repair and immediately available.

From May 19 to October 20, more than one million cars have been loaded with revenue freight in 18 different weeks. In 14 of those weeks the record loading which was made during the week of October 14, 1920, when the total was 1,018,539 and which stood until this year, has been exceeded.

The number of locomotives in need of repair on October 15 was 10,509, or 16.4 per cent, an increase of 686 as compared with the number on October 1. Fourteen and eight-tenths per cent of the cars on line were in need of heavy repair and 1.6 per cent in need of light repair. During the first 15 days in October 19,323 locomotives were turned out of shops and on October 15, 2,487 serviceable locomotives were held in storage. The number of freight cars in need of repair on October 15 was 155,637, or 6.9 per cent, an increase of 4,305 as compared with the number on October 1. Of the total cars on line, 5.2 per cent were in need of heavy repairs and 1.7 per cent in need of light repairs.

Box Car Orders Cancelled

The Car Service Division of the American Railway Association has cancelled its box car order No. 101, which became effective on April 15, directing the Eastern and Southern railroads to send cars to Western districts in preparation for the grain crops, and also its order No. 102 of the same date, applying to the handling of Eastern and Southern ownership box cars in the three Western districts. The cancellation in both cases is effective November 1 and will restore the full operation of car service rules in the handling of Western box cars in Eastern and Southern territory and of Eastern and Southern box cars in Western territory.

In the four months following the effective date of Order No. 101, twenty of the principal Eastern roads reduced the number of Western box cars in their possession by 46.5 per cent; six of the principal Southern roads reduced their holdings of these 47.9 per cent; the net decrease represented by these figures totaled 51,080 cars. During the same period there was a net increase of 84,570 box cars, and also an increase of 98,319 in the number of home box cars on home roads, in the three Western regions. The number of Western ownership box cars delivered empty at Chicago, Peoria and St. Louis during these four months exceeded 100,000 cars.

"The accomplishment of this extremely heavy relocation in the fact of the highest average weekly loading that ever occurred during the same period is a remarkable compliment to the efficient operation and effective observance of Car Service Rules and this special order on the part of the roads in the East and South; the systematic efforts of the Western roads to keep their cars in home territory also contributed to this result," the Car Service Division says in the cancellation order. "In the six weeks following August 15 there has been an increase of 2,028 Western box cars on the principal Eastern lines referred to, and of 925 Western box cars on the principal Southeastern lines. A record will be maintained of the movement of box cars between Eastern and Western territories and of the comparative location of Eastern, Western and Southern cars and further action taken if necessary to maintain the present favorable situation. However, there is no doubt that with a continuance of normal operating conditions and close observance of Car Service Rules, a satisfactory car balance between different sections of the country can be maintained."

A detailed semi-monthly comparison is being maintained of the location of Eastern cars on the principal Western roads and attention will be called to any cases where the records seem to indicate improper handling of this equipment. Statistics compiled of the movement of loaded and empty box cars Eastbound and Westbound through designated passing points extending from the Straits of Mackinac on a line through Cairo to New Orleans, for the six months ending September 30, show that the Westbound loaded business equalled 90 per cent of the Eastbound loaded business, and approximately the same ratio applied even on the main highways East and West between Lake Michigan and the Ohio River. This is a more evenly balanced loaded traffic than has ordinarily been recognized; possibly affected somewhat by the abnormally light grain movement to eastern ports for export. This condition, however, is a very favorable one from a standpoint of automatic relocation of equipment between Eastern and Western territory.

REVENUE FREIGHT LOADED

SUMMARY—ALL DISTRICTS, COMPARISON OF TOTALS THIS YEAR, LAST YEAR, TWO YEARS AGO. WEEK ENDED SATURDAY, OCTOBER 20, 1923

Districts	Year	Grain and grain products	Live stock	Coal	Coke	Forest products	Ore	Mdse. L.C.L.	Miscellaneous	Total revenue freight loaded	Corresponding period 1922	Corresponding period 1921
Eastern	1923	9,701	3,845	52,509	3,063	5,710	6,326	69,486	104,993	255,633	.....	.....
	1922	10,311	3,641	57,998	1,879	6,026	5,322	64,052	98,795	.....	247,624	240,470
Allegheny	1923	2,834	3,809	52,088	5,490	3,626	12,468	52,515	84,463	217,293	.....	.....
	1922	3,623	3,647	54,080	5,304	3,403	8,432	48,251	78,143	.....	204,883	191,201
Pocahontas	1923	261	534	29,172	486	1,798	118	6,732	5,637	44,738	.....	.....
	1922	218	597	18,505	352	1,523	37	5,725	3,697	.....	30,654	37,598
Southern	1923	3,281	3,095	24,400	928	23,450	1,311	41,360	47,848	145,673	.....	.....
	1922	3,883	2,765	23,549	1,089	19,816	1,205	38,382	44,357	.....	135,046	134,783
Northwestern	1923	15,840	11,941	9,464	1,406	17,010	38,362	31,075	47,456	172,554	.....	.....
	1922	17,270	9,168	10,830	1,428	15,027	27,801	27,894	38,795	.....	148,213	133,976
Central Western	1923	12,441	18,340	17,703	291	11,350	2,839	36,598	70,045	169,607	.....	.....
	1922	13,154	17,088	21,528	378	8,654	2,575	33,069	64,647	.....	161,093	154,009
Southwestern	1923	4,425	3,841	5,115	196	7,896	500	15,090	30,320	67,383	.....	.....
	1922	4,692	3,508	7,029	128	5,425	340	13,242	28,012	.....	62,376	72,774
Total West. Districts.	1923	32,706	34,122	32,282	1,893	36,256	41,701	82,763	147,821	409,544	.....	.....
	1922	35,116	29,764	39,387	1,934	29,106	30,716	74,205	131,454	.....	371,682	360,759
Total all roads	1923	48,783	45,405	190,451	11,860	70,840	61,924	252,856	390,762	1,072,881	.....	.....
	1922	53,151	40,414	193,519	10,558	59,874	45,712	230,615	356,046	.....	989,889	.....
	1921	50,443	39,847	215,495	6,620	53,655	22,589	238,020	338,142	.....	.....	964,811
Increase compared	1922	.....	4,991	.....	1,302	10,966	16,212	22,241	34,716	82,992	.....	.....
Decrease compared	1922	4,368	.....	3,068	.....	.....	.....	.....	.....	.....	.....	.....
Increase compared	1921	.....	5,558	.....	5,240	17,185	39,335	14,836	52,620	108,070	.....	.....
Decrease compared	1921	1,660	.....	25,044	.....	.....	.....	.....	.....	.....	.....	.....
Oct. 20	1923	48,783	45,405	190,451	11,860	70,840	61,924	252,856	390,762	1,072,881	989,889	964,811
Oct. 13	1923	50,294	43,875	194,963	11,928	75,230	60,579	250,027	397,562	1,084,458	969,487	910,529
Oct. 6	1923	50,019	41,554	191,741	12,440	73,259	67,425	254,253	388,999	1,079,690	953,952	899,681
Sept. 29	1923	50,896	41,624	200,970	12,936	75,491	69,172	253,176	393,009	1,097,274	977,791	904,831
Sept. 22	1923	48,906	41,751	182,524	13,339	73,629	75,527	250,369	374,391	1,060,436	961,138	873,641

Compiled by the Car Service Division, American Railway Association.

R. H. Aishton Outlines the Purposes of A. R. A.

Abstracts of Other Addresses Presented at Annual Meeting of Freight Traffic Officers

THE PRINCIPAL speakers at the meeting of American Association of Freight Traffic Officers, held on October 23 at the Hotel Chase, St. Louis, Mo., were R. H. Aishton, president of the American Railway Association, who outlined the functions of the Traffic division of the A. R. A. and the co-ordination of that division with the other divisions; Donald D. Conn, who spoke on regional advisory boards and public relations; A. S. Dodge, who reported on the work of the weighing and inspection committee, and Joe Marshall, of the Freight Claim division of the American Railway Association, who spoke on freight claims. Abstracts of their addresses follow:

R. H. Aishton on Functions of A. R. A. Traffic Division

The American Railway Association is a voluntary association of all the railroads of the United States, Canada and Mexico, with an associate membership of most of the railway interests in the southern continent and Cuba. "Its object is by recommendation to harmonize and co-ordinate principles and practices of American railroads with respect to their construction, maintenance and operation." That is the way the article of organization reads. I think, however, the purpose of the American Railway Association can be better defined possibly as the expression of the efforts of the individual railroads in the public interest to function as a continental transportation machine. In other words, it stands ready as an organization to function in any manner that the railway executives determine it would be advantageous to function in various problems as they arise which have to be treated in a continental way, in the public interest.

When it started, its simple duty was to bring about order out of the chaos existing 51 years ago regarding differences in time, which so many of you remember was so troublesome; and the Association gradually developed for 40 years. It has performed many functions in the last 10 years that seem foreign to the duties assigned it.

The Transportation Act placed certain duties on the Interstate Commerce Commission relative to service, and it was advisable and indeed necessary that, particularly on matters having to do with service, the distribution of cars, the assignment of locomotives, and in a great many other directions, there be a co-ordination of all the efforts of the railways forming the transportation machine to meet emergencies in service that may arise. To handle this the Car Service division was organized under the direction of the American Railway Association, and it has become necessary to deviate in a great many other ways from the original purpose of the association. In the reorganization the present form of organization of Traffic Division III was adopted.

In order that there might be no conflict with traffic organizations working under direction of the Association of Executives which has charge of matters affecting rates, fares and charges, these questions were absolutely eliminated from the jurisdiction of the re-constituted Traffic division. The American Railway Association neither considers nor has anything to do whatever with rates, fares, charges or classifications. The only time that any matter of this kind would come before the Traffic division would be in connection with other problems, which sometimes arise when the Traffic division furnishes the means by which the Transportation and other divisions can get quick action necessary to produce satisfactory results.

The function of the Traffic division may be described as the consideration of all matters requiring discussion with the public and issuance in tariff form in accordance with the requirements of the Interstate Commerce Commission, except as to the specific rates, fares and charges to be shown in tariffs of the individual carriers. The Traffic division is the connecting link between the traffic departments of the several carriers, on the one hand, and the various other departments, with which the public does not come in direct contact, but whose work requires the establishment of regulations, etc., in which the public has a direct interest.

The Traffic division differs in its make-up from the other divisions of the association, in that its control is vested in a General Committee composed of four representatives from each of the Eastern, Western and Southern traffic executive committees, whose recommendations are transmitted to the carriers through the medium of these executive committees, insuring prompt conclusions and concurrent action. The Traffic division has a representative on the Advisory council of the association who co-ordinates the work with that of other divisions.

You traffic men are the sales division of the railroad machine, and the only thing you have to sell is transportation. Take a lesson from industry. There is no prosperous industry today that does not constantly and periodically keep its salesmen posted through actual contact with conditions in the works.

Get closer to the "works"; know what is going on in the Operating, Transportation and Mechanical divisions; know what questions are brought before these divisions and the reasons for them. There is no question but that many of these can be ironed out without difficulty and a better understanding reached and innumerable instances of dissatisfaction on the part of the public can be removed by such close contact.

A fair example of what you traffic men can do when you know what the "works" are doing and what the conditions inside the "factory" are, is emphasized by the success that has attended the efforts of the railroads in meeting the program which they agreed to last April. Why—because every traffic man in this country took up the matter with enthusiasm with the shippers and with everybody else, and as a result the entire trend of public opinion and public thought regarding the railroads has been changed.

The organization I represent earnestly invites your co-operation in every effort which will result in more efficient service from the standpoint of the carriers and of the public, that our highest standards may be maintained and new criteria set by which to measure our efforts.

There is no body of men having more to do with the formation of public opinion regarding the railroads and railroad affairs than you have, and that brings us to the subject of public relations. I just want to point out one phase of this which has a very direct interest to you and which, in my opinion, will, if heartily supported by you, go a very long ways towards a wide and sound knowledge among the shippers and the general public as to the real basic facts regarding transportation and service and the many questions interwoven with this—in other words, the "railroad problem."

The Traffic division, A. R. A., is keeping up the Agricultural Report of the Joint Committee of the House and Senate, which probably is one of the most complete analyses of the transportation question that has ever been put together. It was turned over to the A. R. A. by the chairman of the

committee that formulated it, with the understanding that the information would be kept up-to-date, would be available for use of the members of Congress, or anybody else that desired it, and the work is being done and is being supervised by your executive committee. The information that is developed in this report is valuable. It's something that every member of this organization and the association should study if he is called to put himself in the position to answer the various questions that come up from time to time in contact with shippers relative to these questions. Get behind that also.

In conclusion I want to say to you that I am an optimist and always shall be, if for no other reason than because a pessimist on the continued growth and development of this country of ours is invariably ninety per cent wrong, but I am particularly optimistic now regarding the future of the railroads. In the first place, there exists today the best appreciation and co-operation of the shipping public that we have ever experienced. We must, however, constantly recognize that the country is rapidly growing, areas of production and trade channels are changing, the advent of highway competition, the Panama canal, and many other evolutions are bringing new problems to us which must be anticipated before their full effect is felt.

Donald C. Conn Speaks on Regional Advisory Boards

Donald C. Conn said in part: The continuance of private and competitive operation of railroads depends largely upon the interwoven interests of the public and railroads being properly expressed and carried forward, a constant public understanding of railway operation and difficulties, a public participation in aiding you to produce needed and efficient service, and a public relation with the railroads which will adjudicate the differences and disputes between them in the same informal manner as common everyday commercial disputes between organized business are settled. The facts of any given difference between shipper and carrier on transportation and car matters, once determined, point the way to solution. The shipping public and the railroads in each territory need no compelling force of further governmental regulation to initiate the corrective or determine the conclusion. Therefore, the Regional Shippers' Advisory boards represent a partnership in interest towards the common goal of maintenance of adequate service and the perpetuation of our railroads in private ownership and competitive operation.

At the inception of this movement we tried out one regional organization as an experiment. The Car Service division went to the agricultural, industrial and banking interests of Minneapolis and St. Paul and discussed at length the purposes of such an organization and the place it would fill in our scheme of relationships. These people participated in the experiment of organizing a regional advisory board in the Northwest to function around our district manager at Minneapolis. This organization had its inception during the latter part of December, 1922, went through experimental stages until April, 1923, at which time the American Railway Association adopted the movement as a part of its national program. Since that time seven additional regional advisory boards have been organized within each operating district served by a district manager of the Car Service division. Some are still in the state of refinement, but the movement is being enthusiastically received by all factors of public life in the country, and while three additional regions are yet to be covered by such organizations, it is hoped to have them entirely completed early in 1924.

The seven basic points upon which their inception is predicated are: To form a common meeting ground between shippers, local railroads, and the carriers as a whole as represented by the Car Service division, for the better mutual understanding of local and general transportation requirements; to analyze transportation needs in each territory; to assist in anticipating car requirements; to study production, markets, distribution and trade channels of the commodities local to each district, with a view of effecting improvements in trade practices when related to transportation and promoting a more even distribution of commodities where practicable; to promote car and operating efficiency in connection with maximum loading and in the proper handling of cars by shippers and railroads; to secure a proper understanding by the railroads of the transportation needs of shippers, that their regulations may fit shippers' requirements and, conversely, to secure understanding by the shippers and their co-operation in carrying out necessary rules governing car handling and car distribution; to acquaint shippers and railroads in each section of the country of the seasonal requirements in their section, in order to promote intelligent co-operation in the handling of equipment between the different districts of the country; to adjust informally car difficulties which may arise in each local territory between the carrier and shipper, and to give the shipping public a direct voice in the activities of the Car Service division on all matters of mutual concern.

The Regional Advisory Board movement represents an acceptance by the public of a definite responsibility to the railroads. In the everyday performance of the boards and its committees, the Car Service division will obtain a more intimate knowledge of territorial needs and be better able to avert car shortages rather than cope with them after they occur. The boards will, of course, not prevent car shortage, but their co-operation will greatly lessen its extent and severity.

If we drive to the root of the majority of our car troubles we will find that many are based upon conditions outside of the control of the carrier, conditions incident to marketing methods, lack of storage capacity, glutted markets, and an unrelated supply and demand. It is hoped that through the regional board agencies many of these basic economic problems can be worked out and thus avoid the necessity of utilizing transportation regulations to rectify the cause of equipment delay and shortage which are grounded in a disability of agriculture or industry itself.

We may properly summarize this movement by saying that the Regional Board is a voluntary institution of the publice to co-operate on transportation matters with their railroads and the Car Service division, to aid in adjusting insufficient transportation, to aid in anticipating transportation requirements, to adjudicate their own disputes, and to form the pivot of public opinion on transportation affairs in each territory. They are predicated upon the principle of voluntary negotiation as contrasted with the substitution of statutory law as a panacea for economic problems. This principle is sound and must not fail.

As you know, the Traffic Committee on Public Relations, consisting of 11 traffic vice-presidents, was appointed by the Traffic division of the American Railway Association to supervise our obligation in keeping currently the relationship of the freight cost to the trend of commodity price cycles, to handle such traffic matters of public concern inter-related with operation which may be referred to it by the Traffic division, and to act as a definite continuing point of contact between the "sales" and "works" departments of our institution. After making a careful study of general economic conditions surrounding the production and movement of 25 essential commodities, the committee decided upon the method for obtaining origin and market price data.

If we begin to think in terms of the relationships of freight cost to price levels and to the cost of the other distribution factors and the marketing of our products, we soon determine that on the majority of commodities the freight cost is a very small proportion thereof, and reductions in the general level of rates on most commodities are lost in the shuffle of our scheme of distribution and neither find their way to the

producer nor directly to the consumer, but increases in rates are often used as an excuse to increase the price to the consumer. Thus far, in our investigation we have developed the fact that fluctuations in prices paid for wheat to the farmer in Kansas, on the same grades and on the same day, exceed any reduction in rates which has been sought by the producers this year. We find in many instances where the price paid to the farmer for the same grade of wheat on the same day, is greater at a point which has a higher freight rate to the primary market than at a point which has a lower rate. We find in our study of live stock, taking one car after another as sold by a commission house in the Chicago market during the first six months of 1922, and including all kinds and descriptions of stock from long and short haul points of origin, that the average price paid by the producer per hundred weight is approximately $7.83, the average freight 32 cents per hundred weight, and the net proceeds to the grower $7.34 per hundred weight. Manifestly no fair-minded shipper or consumer of this product can claim that rates on live stock are excessive when the producer obtains a price so closely related to that paid for his product after transportation and other distribution costs are deducted.

I personally made an investigation of retail prices of potatoes in Washington on Friday, October 19, and found that the prevailing price charged by the cash and carry stores for Michigan and New York potatoes was 8 lb. for 25 cents, or $3.12 per 100 lb. In referring to our records we find that these potatoes on October 8 paid the producer at Rochester, N. Y., $1.45 per 100 lb. sack, and that the freight to Washington was 33½ cents per 100 lb. We find that the producer at Benton Harbor, Mich., received $1.03 per 100 lb. sack and that the freight was 51 cents.

We have held the thought for a long time that the cost of transportation when considering the services rendered was far below the cost of other distribution factors when considering the services which they render. It is time for producers and consumers to be advocating reductions in transportation charges only after they have made a sincere attempt to effect sound and efficient distribution practices, and also the spread between the producer's price plus the freight and the final retail price. Freight rates are regulated and represent the only factor of distribution which the public can get at, and they strike there whether that factor represents the cause of their trouble or not. The only way to show that it does not is to set it down opposite the price of commodities and the cost of each factor of distribution. We can talk for hours about ton-mile and car-mile earnings, but there is nothing so potent to uphold the general level of rates and to show how small a percentage they are of the prices paid by the consumer for the product. This investigation and analysis has only commenced, and its success also depends upon the active co-operation of the individual railroads with the view that our request may be met promptly and definitely as each forms an important link in the complete story. Many radical politicians talk idly of freight rates because they know nothing of the other economic phases surrounding successful market conditions, and it will be our effort to determine these facts and give them to you for your use and guidance.

A. S. Dodge Reports on Committee on Weighing and Inspection

Mr. Dodge said in part: You recall the hearing by the Interstate Commerce Commission in 1913, in the matter of investigation of alleged irregularities and discrepancies in the weighing of freight by carriers subject to the act to regulate commerce. Among other things the Commission suggested that the carriers and the shippers get together and formulate uniform rules. The then Weighing committee of the American Railway Association and the Weighing committee of the National Industrial Traffic League held many joint sessions during the next year, with a representative of the commission present, and the result was the national code of rules governing the weighing and reweighing of carload freight, which received the tentative approval of the commission June 9, 1914.

From time to time there have been suggestions made from one source and another for changes in the National Code of Weighing Rules, but the National Industrial Traffic League Committee has been averse to considering any changes until the code was made operative over the entire country. This was finally accomplished by its adoption last spring by the roads in the southeast.

At our last joint conference with the National Industrial Traffic League Committee, certain changes were jointly recommended that will have the effect of clarifying the present rules, particularly those that have been under criticism in the past. These changes were put up to the general committee and have been approved and were sent to the several traffic committees for final agreement and publication. When that has been accomplished those changes will have to be submitted to the Interstate Commerce Commission for tentative approval in the same way that the code itself was tentatively approved in 1914.

One important subject that has not been disposed of is the moisture content of soft coal. The National Code required the carriers to publish the moisture content for their respective coal districts, which is very generally taken care of by Eastern trunk lines in tariff publication, without contest. The roads interested in coal fields in Illinois, Iowa, Missouri, Kansas, Oklahoma, Arkansas, Colorado, Utah and Wyoming; in other words, the Western Trunk Line Committee and the Southwestern Tariff Committee appointed committees, and after working upon the subject for nearly a year decided, largely from the laboratory tests made by the Bureau of Mines, that all bituminous coal originating in the states named, inherently contained not less than one per cent of moisture that evaporated, under normal conditions, in transit. This was published and is still in effect over a considerable portion of the territory, but the Northwest Coal Dealers protested and the Interstate Commerce Commission, after the usual hearing held at Minneapolis, July 5, 1917, ordered the carriers serving that district to take the one per cent out of their tariffs until better evidence was produced showing the fairness of the deduction. This occurred during the World War, and nothing in the way of tests could be made then. Since that time this committee and the National Industrial Traffic League committee have been trying to find some reasonable, practicable way to ascertain the moisture in soft coal, but cannot claim to have made much progress so far. Still, we have hopes that with the assistance of some of the larger coal carrying roads we will be able to work out a basis that will be satisfactory to all concerned.

Another unfinished subject is the tolerance to be used with weights of lumber at destination. Several committees, representing both carriers and shippers, have had this subject in hand, but no definite action has been agreed to.

The Weighing and Inspection committee has accomplished a few things, among which are the recommendation that no rule be substituted for Car Service Rule 17, which the Transportation Division cancelled July 1, 1922, because few roads ever adopted it; the issuance of a pocket edition of the Consolidated Classification; uniform rules for the handling of household goods; the reduction of the size of bureau stamps used on waybills to comply with the request of the Association of Accounting Officers; and a uniform rule to prevent insignificant corrections in weight of L. C. L. shipments for less than one per cent with a minimum of 10 lb.

Joe Marshall Talks About Freight Claims

Mr. Marshall said in part: For three years the committee on freight claim prevention has been engaged in the work of co-ordinating the activities of the railroads as well as en-

gaging the sympathetic co-operation of the shipping public. To serve as a guide in their work, each freight claim department prepares each month a statement showing the loss and damage expenditures, divided by 36 commodities and 17 principal causes, each subdivided between carload and less-than-carload freight. This form is consolidated in the office of the secretary and reproduced in letterhead size and distributed quarterly. There are 1,250 items on this form.

The one outstanding amount in freight claims covers claims on fresh fruits and vegetables, which totaled $8,500,000 last year and $13,500,000 the year previous. One cause is unlocated loss of entire package, a less-than-carload problem, which is almost $4,000,000. Unlocated damage and rough handling totals $4,250,000, and $6,500,000 on carload freight respectively, while defective equipment and delay amounts to $4,500,000 each.

During the past 20 years, loss and damage has grown over 800 per cent, while the means we have to pay this bill, gross freight revenue, increased but 257 per cent. Loss and damage was less than one per cent of gross freight revenue up to the year 1903, and has approached that ratio only twice since that date. Loss and damage runs in cycles of four years of increase and two years of decrease, followed by another four years of increase and two years of decrease. The end of 1922 closed a period of two years' decrease. According to past experience the account should rise for four years unless railroad men break this cycle.

Traffic expense is 1.84 per cent of the total railroad expense, and loss and damage is 1.78 per cent, or a sum equal to what it costs to develop the traffic and serve the patron is again paid out to shippers for alleged failures in transportation. Loss of entire package from carload takes 2.58 per cent of the total loss and damage bill, or over a million dollars. Loss of entire packages from less than carload shipments is 7.87 per cent of the total, or nearly four million dollars. The railroads are studying a plan which will reduce this item. We ask large receivers of freight in towns served by two of more railroads, to keep a separate record of all freight delivered to them astray in order to help us prevent the payment of one road for an alleged lost package or shipment delivered astray by another road. The railroad plan contemplates joint matching of such overs and shorts. Unlocated losses, carload, is 4.47 per cent, or over two million dollars, of which the largest item is grain and coal. The only machine in our commercial life which is expected to operate without attention seems to be the average scale. You will find them in elevators, on public squares, in coal yards and other places. Claims due to damage and rough handling in carload freight alone are nearly eleven million dollars, of which the larger part is on perishables.

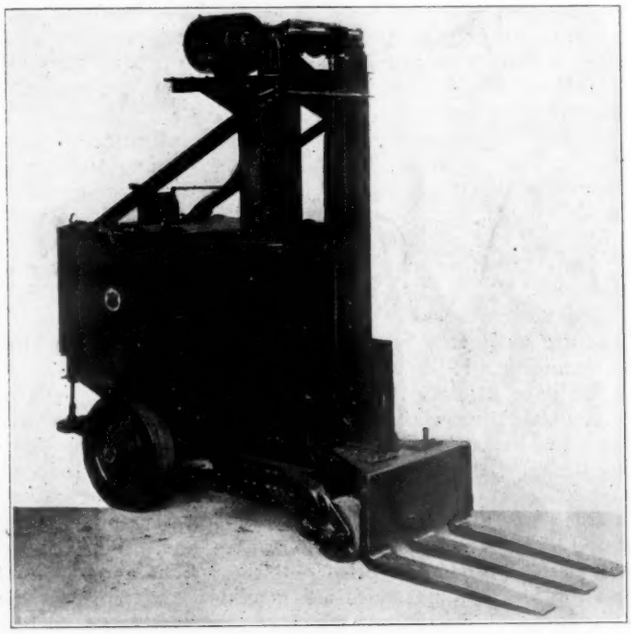
Ewing Galloway

The New York Central Station, Rochester, N. Y.

A New Lifting Truck

A NEW MODEL tier-lift truck has recently been developed by the Lakewood Engineering Company, Cleveland, Ohio, which embodies the special features of picking up a load without requiring the use of platform skids, and of stacking materials in quarters where a machine requiring loading and unloading skids could not be used advantageously.

The new truck consists essentially of an electric truck with a carrying platform located beyond the front axle of the machine. The platform is made of a series of three forks so shaped that they may be inserted beneath castings, barrels, plates or other materials, after which the material can be raised to a point where it is desired to stack it. The truck is capable of picking up 2,000 to 2,500-lb. loads which

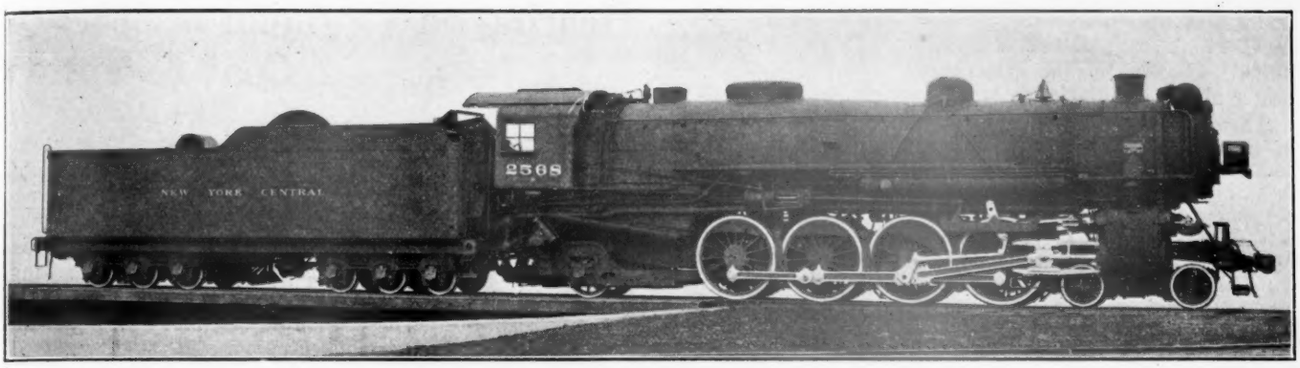


The Lakewood Fork Tier Lift Showing the Construction of the Platform and Lifting Mechanism

are placed on 2-in. by 2-in. strips and permits tiering or stacking of the materials without the use of skids. The driving and lifting mechanism of the truck consists of a worm gear connected to an independent electric motor which provides sufficient power to raise such commodities as flat paper, barrels, radiators, etc.

The truck is made in various lifting heights according to the user's needs. It has been placed on the market after about a year's testing in actual service. With respect to its performance, the report is made that in loading tin, an operator and helper are able to pick up the plate, transfer it a distance of 100 ft. and load it at the rate of one car every hour-and-a-quarter.

EMPLOYEES OF THE Altoona shops of the Pennsylvania numbering 15,000, through elected representatives, have passed a resolution addressed to the Interstate Commerce Commission protesting against any attempt on the part of the officials of the state of Pennsylvania or any other state in recommending any reduction in freight or passenger rates at this time to increase the miners' wages. This resolution was occasioned by the suggestion of a decrease in freight rates in order to absorb the 10 per cent increase in wages granted the anthracite miners under Gov. Pinchot's settlement plan. The railroad men fear that a loss in railroad income would ultimately be met by reduction in their wages.



The First Three-Cylinder Heavy Freight Locomotive in America

Three-Cylinder Locomotive on New York Central

4-8-2 Type for Freight Service Designed To Develop High Tractive Force and High Efficiency

For several months past the New York Central has been operating in freight service on the Mohawk division a three-cylinder simple locomotive of the 4-8-2 type. The design is similar to the two-cylinder Mohawk locomotives built in 1916 and 1917.* The locomotive was constructed by the American Locomotive Company for experimental purposes to determine whether the division of work between three sets of pistons, crossheads and main rods would be desirable in a heavy freight locomotive, as well as to determine whether the three cylinders will make possible an increase in thermal efficiency by more expansive use of the steam.

The locomotive has three simple cylinders, 25 in. in diameter by 28 in. stroke. The boiler is equipped with a Type E superheater, the Superheater Company's feedwater heater and a trailer booster. Including the effect of the booster, the maximum tractive force is 75,700 lb. The tractive force of the two-cylinder Mohawk type is 51,400 lb.

Since this is the first application of the three-cylinder principle on a heavy freight locomotive in this country, it may be of interest to review briefly the advantages of this type from the mechanical standpoint. Among the most important benefits is the reduction of stresses on each set of pistons, crossheads and main rods. In this case, while the three-cylinder arrangement increased the tractive force 21 per cent, it also reduced the piston thrust, based on 200 lb. pressure, from 123,000 lb. to 98,000 lb., or 20 per cent. The even turning moment on the driving wheels obtained with three cylinders is also advantageous in permitting the use of a lower factor of adhesion. In any locomotive, the adhesive weight must be great enough to prevent slipping with the maximum tractive force developed throughout a complete revolution. In a three-cylinder locomotive, the maximum is only 8 per cent higher than the average, while with the two cylinders, it is 23 per cent above. This means that for a given weight on drivers the three-cylinder locomotive can develop 15 per cent greater rated tractive force than a two-cylinder design without increasing the tendency to slip the wheels. The factor of adhesion used on the three-cylinder locomotive is 3.73 which would be equivalent to about 4.29 in the two-cylinder type. In Great Britain and Germany where the three-cylinder arrangement has been extensively used, it is claimed that the six exhausts per revolution have a marked effect in increasing the efficiency of combustion.

The two outside cylinders of the locomotive are placed horizontally with the center lines 2 in. above the centers of the wheels. The center cylinder has been inclined at an angle of 8½ deg. This brings the front end of the cylinder higher than the bottom line of the boiler barrel and the bottom side of the smokebox has been raised at the forward end to give the required clearance. The right and center cylinders and valve chambers are made in a single casting which extends to the inner side of the left frame where it is bolted to the left cylinder casting.

The crank axle is of the built-up type with step fits in the crank cheeks. The inside crank pin has a bearing 7½ in. wide by 12 in. in diameter. This bearing is lubricated with hard grease which is forced in from the outside of the axle and passes through holes in the crank cheeks and the center crank pin to the surface of the bearing. The center guides, which are of the two-bar type, are lubricated through oil pipes from the running board.

One of the interesting features of the design is the method of driving the valve for the inside cylinder from the outside valve gear. The center lines of the three valves are all horizontal and at the same height. A transverse forked lever is placed ahead of the cylinder castings, one end of the lever being connected to the front extension of the left valve stem, the stationary fulcrum being one-third the distance from the opposite end. The right-hand end of this lever forms a fulcrum for the center of a floating lever, one end of which is connected to the right valve stem, while the other end drives the valve for the center cylinder. This simple arrangement avoids the necessity for the third set of valve motion. In order to facilitate the application of valve motion levers, the bumper beam braces are secured by pins at the top and bottom ends, making them readily removable.

Double ported piston valves, 11 in. in diameter, are used for all three cylinders. The valves have a maximum travel of 6 in. with 1⅛-in. lap, ⅛-in. exhaust clearance, and 3/16-in. lead.

To permit the application of the booster a cast-steel Delta type trailer truck was installed, with equalizers between the driving wheels and the trailer.

Because of the large cylinder volume on the three cylinder locomotive, it is necessary to provide the maximum possible

*For a description of these locomotives, see the *Railway Age* for December 28, 1917, page 1167.

boiler capacity. There are 216 flues 3½ in. in diameter by 24 ft. 11 in. long, all but 40 of these containing superheater units. The use of the Superheater Company's feedwater heater also materially adds to the capacity of the boiler.

The tender used with this locomotive has a capacity of 15,000 gal. of water and 16 tons of coal. It is of the rectangular, water-bottom type and has a cast-steel frame carried on Commonwealth six-wheel trucks.

TABLE OF DIMENSIONS, WEIGHTS AND PROPORTIONS

Type of locomotive	4-8-2
Service	Freight
Track gage	4 ft. 8½ in.
Cylinder, diameter and stroke	3—25 in. by 28 in.
Valve gear, type	Walschaert
Valves, type, size	Double ported Piston—11 in.
Maximum travel	6 in.
Outside lap	1⅛ in.
Exhaust clearance	⅛ in.
Lead in full gear	3/16 in.
Weights in working order:	
On drivers	241,500 lb.
On front truck	66,000 lb.
On trailing truck	59,500 lb.
Total engine	367,000 lb.
Tender	267,800 lb.
Wheel bases:	
Driving	18 ft. 0 in.
Rigid	18 ft. 0 in.
Total engine	40 ft. 7 in.
Total engine and tender	82 ft. 6 in.
Wheels, diameter outside tires:	
Driving	69 in.
Front truck	33 in.
Trailing truck	45 in.
Journals, diameter and length:	
Driving, main	11½ in. by 13 in.
Driving, others	11 in. by 13 in.
Front truck	6½ in. by 12 in.
Trailing truck	9 in. by 14 in.
Boiler:	
Type	Conical
Steam pressure	200 lb.
Diameter, first ring, inside	80 in.
Firebox, length and width	114¾ in. by 84½ in.
Arch tubes, number and diameter	4—3 in.
Combustion chamber length	None
Tubes, number and diameter	None
Flues, number and diameter	216—3½ in.
Length over tube sheets	24 ft. 11 in.
Gas area through tubes	328 sq. in.
Net gas area through flues	1,054 sq. in.
Total gas area through tubes and flues	1,382 sq. in.
Grate area	66.9 sq. ft.
Heating surfaces:	
Firebox and comb. chamber including arch tubes	242 sq. ft.
Tubes and flues	4,913 sq. ft.
Total evaporative	5,155 sq. ft.
Superheating	2,158 sq. ft.
Comb. evaporative and superheating	7,313 sq. ft.
Special equipment:	
Brick arch	Security
Superheater	Type E
Feedwater heater	Superheater Co.
Stoker	Elvin
Booster	Franklin
Tender:	
Style	Rectangular
Water capacity	15,000 gal.
Fuel capacity	16 tons
Trucks	6 wheel
General data estimated:	
Rated tractive force, 85 per cent	64,700 lb.
Tractive force of booster	11,000 lb.
Weight proportions:	
Weight on drivers ÷ total weight engine, per cent	65.8
Weight on drivers ÷ tract. force	3.73
Total weight engine ÷ comb. heat. surface	50.2
Boiler proportions:	
Tractive force ÷ comb. heat. surf	8.85
Tractive force × dia. drivers ÷ comb. heat. surf	611
Firebox heat. surface ÷ grate area	3.62
Firebox heat. surface, per cent. of evap. heat. surface	4.70
Superheat. surface, per cent of evap. heat. surface	41.9

It is expected that dynamometer tests of the three-cylinder locomotive will be conducted during the next few weeks which will give an opportunity for comparing its performance with that of two-cylinder locomotives from the standpoint of hauling capacity and fuel consumption. Operation over a more extended period is necessary to enable any estimate to be made of the relative expense of maintaining three-cylinder locomotives as compared with the ordinary two-cylinder design of the same capacity.

A. B. BUCKWORTH, deputy minister of railways for British Columbia, has resigned to engage in private practice as a consulting engineer, effective November 1. It is understood that the vacancy will not be filled.

Hearing on Virginian Coal Extension

WASHINGTON, D. C.

OFFICERS of the Virginian testified before Director Mahaffie of the Interstate Commerce Commission's Bureau of Finance at Washington on October 31 as to why the Virginian should be authorized to construct an extension of 1.9 miles of its Guyandot river branch in West Virginia to serve a coal mine of the Pocahontas Fuel Company. The commission last spring, without a hearing, denied the company's application for this authority on the ground that the railroad had been unable to give an adequate supply of cars to the mines already in existence on its line and that there are already too many coal mines in existence. The company then asked for a hearing and the case was reopened.

Without attempting to discuss at the hearing the legal question as to the commission's right to limit the number of coal mines, C. H. Hix, vice-president of the Virginian, who was the principal witness, attempted to show that the commission was mistaken as to the facts as to the company's ability to serve its mines, pointing out that the figures used in the commission's report as to the percentage of coal cars furnished during 1922 referred to the abnormal period of the coal strike in the union fields, which greatly increased the demand on the non-union coal mines, and also the period of the railroad shop strike, which resulted in a shortage of serviceable motive power. With the exception of this abnormal period, Mr. Hix testified, the company has been able to provide adequate facilities and is now engaged in largely extending its capacity. Mr. Hix said that 90 per cent of the Virginian's freight traffic is coal and that unless the coal traffic is allowed to develop, the road's business will dry up. The company has acquired 1,500 new coal cars and additional locomotives this year, is building a new coal pier at Sewell's Point at a cost of $3,250,000, which will increase its capacity to a point far in excess of its tidewater tonnage for years to come, and is also electrifying 134 miles of its line a a cost of $13,000,000, which will increase its capacity approximately 60 per cent, in addition to making large expenditures for passing tracks and other facilities to increase its capacity. Except during the abnormal period of the two strikes, he said, the company has had a surplus of coal cars and even during that period would have had no car shortage if it could have had the full use of its equipment. During the strike in the non-union mines its cars were scattered on other railroads all over the country, and later in the year it was unable to place as many cars as were required, because of the condition of its locomotives. He also said that the mine ratings were grossly inflated under the rules adopted by the Railroad Administration and whereas the maximum rating would call for 1,800 cars a day, the largest loading was 1,050 cars a day. The road now has sufficient car capacity to take care of the maximum loading. During 1922 also, a large number of certain classes of its cars were out of service, because of delays in securing necessary materials for the repair of steel cars.

Other Virginian officials testified in detail as to the car supply at various times and as to the increases being made in the capacity of the road.

CORRUGATED STRAWBOARD BOXES for boots and shoes constitute the subject of Freight Container Bureau circular No. 11, issued by B. W. Dunn, chief engineer of the Bureau, on October 10. Like former circulars in this series, this one consists of a detailed study of the construction of containers with a view to stimulating discussion between the railroads and the shippers and among all classes interested. Circular No. 12 is a similar document, dealing with crates for upholstered furniture.

Investment Bankers and the Transportation Act

Express Confidence in Fundamental Principles at Annual Convention in Washington

WASHINGTON, D. C.

RESOLUTIONS expressing confidence in the fundamental principles underlying the Transportation Act of 1920 were adopted by the Investment Bankers' Association unanimously at its convention at Washington, D. C., on October 31. The association believes, the resolution states, "that while the act contains certain imperfections, it has nevertheless proved to be a long step in the direction of the solution of the American railroad problem, and that, subject to such improvements in operation as experience may suggest, it should stand an expression of the cardinal principles involved in the complex relationships between the government, the shipper and the private owner of railroad securities. Unless these principles are clearly formulated and fairly administered, it is obvious that private capital cannot be collected to provide extensions and betterments to the transportation system, which are so vital to the adequate development of the country."

These resolutions were proposed by Ray Morris of Brown Brothers & Co., New York, following the presentation of the report of the railroad securities committee, of which he was chairman. The report was in part as follows:

Report of the Committee on Railroad Securities

When your Committee on Railroad Securities made its report in 1921, the operation of the new Transportation Act was in its early stages, but the committee at that time felt clearly that the act was legislation of fundamental importance; that it had laid the foundation for the rehabilitation of railroad credit and that with the advent of easier money, adequate financing might once more become possible. The conclusions of that report have been well borne out by the events of the last two years. Since it was written, the statutory rate intended to assure earnings adequate to sustain credit has expired by limitation. Since March 1, 1922, the measure of the fair return has reverted to the Interstate Commerce Commission without there being any statutory instructions covering this point, and the commission has specified 5¾ per cent. There is no indication in the recent rate decisions of the Commerce Commission that they have any intention of disturbing the present general rate basis. This basis of rates, applied to the commission's tentative valuation figure, has so far fallen somewhat short of producing the return designated by Congress for the trial period. In spite of this fact, if we compare the general earning picture of American railroads with that of the years prior to rate regulation, we cannot get the impression that the railroad industry of the country, taken as a whole, is doing less well under the existing rate structure as promulgated by the Interstate Commerce Commission. Certain whole sections, however, are obviously receiving a return far short of the measure of fair return set by the commerce commission. The railroads in New England are a conspicuous example of this, and it seems probable that when the valuations for the far northwestern railroads are completed the return on the value of this large and important group of roads will fall materially short of the commission's figure. As against this, there are certain important groups of railroads in the country which are apparently earning slightly in excess of 5¾ per cent on their property investment.

Reviewing the operation of the Transportation Act of 1920 then, not in the light of a measure which would be in all respects theoretically perfect, but applying to it the test of expediency; that is to say, whether or not it was good legislation in the light of the economic and political circumstances of the time, we are clear that the act has justified itself and that, balancing all considerations, it leaves the position of the railroad industry materially better than it was before the passage of the Act and, as a matter of fact, better than it was during most of the early competitive period when there was no effective rate legislation.

One Weak Spot

Your committee in 1921 pointed out one obviously weak spot in this legislation. Control of rates was vested in the Interstate Commerce Commission; control of wages, the largest item in the expense column, was not vested in the Railroad Labor Board because this board did not have the power to impose its decisions either on the carriers or on the employees, but the Railroad Labor Board, nevertheless, was the agency charged with the responsibilities of investigation, recommendation and publicity in the matter of wages paid railroad employees. The government body, in other words, with definite authority over rates, which are nearly the entire source of revenue, was not correlated with the other government body which had an important advisory position in reference to the largest expense item, and your committee in 1921 very properly pointed out that it was improper and dangerous to separate what might be called the government's advice about wages from its definite rulings about rates.

A further survey of the act, in retrospect, indicates certain other rather basic limitations. Broadly speaking, the railroad cannot enlarge their earnings on the basis of present rates without also enlarging their facilities. In other words, the present volume of traffic taxes their facilities to the utmost, and we, therefore, get the vicious circle where earnings cannot be enlarged to improve credit without first improving credit so as to command the capital necessary to enlarge facilities so that traffic and earnings may be enlarged. It is rather difficult to show this statistically, other than to point out that the aggregate railroad mileage of the country has decreased, instead of increasing, since the act went into effect.

Another point worth considering is that the railroads now are contributing in two ways to expenditure which is, at least in part, a community betterment, and from which the railroads as such get no direct return. Expenditure for the abolition of grade-crossings, or other improvements in congested areas is for the benefit of the community as a whole, but the railroad contributes to them in part out of its taxes (which are proportionately heavier than taxes of the community in general), and in the second place, by capital expenditures on its own credit. A material portion of the taxes paid by the railroads in certain sections also goes into highway construction and directly benefits an important competitor; the motor truck.

Reduced Legislative Output

With these exceptions, the general workings of railroad control under the Transportation Act of 1920, as seen in retrospect, have been on the whole satisfactory; not perhaps to the investor of earlier days who bought stocks on the theory that he became absolute owner in a highly profitable situation, but satisfactory in that they have greatly stabilized the chaotic railroad situation of a few years ago; have greatly reduced the output of hasty and ill-considered railroad legislation; have made it possible for the better located and better managed railroads to secure funds for equipment and improvements; have thus furthered the physical development of the country; and have made the position of the railroad bondholder at least better than it has been for some years.

It was obvious to most careful observers of the railroad situation at the time when the Transportation Act was first under discussion, that any basis of statutory rate regulation which would provide a return that the courts would be at all apt to hold fair either on invested capital or on present value, would still come far short of being an adequate return for the poorly located or the specially handicapped railroads, but would produce a good margin for the better situated railroads. Subject to the particular rate condition prevailing in certain districts such as those enumerated above, this state of affairs has worked out as anticipated. The principle attached to this scheme of rate adjustment, whereby the railroads earning in excess of the so-called fair return shall divide their earnings on some basis with the government, is a principle which is probably politically expedient, whether or not it can be called fair to those who invested in railroad stocks on the theory that as owners of the property they were entitled to all the earnings in excess of operating expenses, taxes and interest charges. An important detail, not yet adjudicated, is whether this return is cumulative, or whether the government can recapture earnings in the good years, at the expense of the bad ones. If the return is not cumulative it is obviously misleading to use a definite figure, such as 6 per cent, in describing it.

The present status of the recapture clause, for the recovery of excess net operating income into the general railway contingent fund, is that only about $100,000 has been collected by the government, mostly from the smaller carriers. So many legal points of dispute have arisen, that a Supreme Court decision is un-

doubtedly needed to determine whether the government's right of recapture as set forth by the act is an unconstitutional taking over of private property. Apart from this point, the method of obtaining valuations on which the earnings are calculated, is also a matter which is obviously going to need clarifying by court decision. In general, the Interstate Commerce Commission's Division of Valuation has held that the railroads cannot claim as part of the present-day value of property devoted to public use, the earlier built-up cost of bringing the property to its present condition.

But if the commission insists on determining existing present value without reference to past history, then it is confronted with the question of applying an index-number increase to measure the difference between 1923 costs and actual investment made at the time when the work was done. It is also confronted with the problem of valuing terminal real estate as, for example, in New York City, where the cost of replacement with real estate values what they are today would, of course, be enormously in excess of the figure taken in the valuation accounts as representing actual invested capital.

Higher Valuation Likely

In a word, if the commission and the courts hold that present-day replacement value is to be the measure, it is hard to see how the use of an index number can be avoided, and how the terminal property values in the great cities can be taken on the basis of costs fifty or sixty years old. If, on the other hand, actual invested capital is the best, it is hard to see how the modern built-up railroad system can be valued without taking into consideration the cost of work replaced throughout the years by better and more modern construction. Either alternative would apparently produce valuation figures much higher than those at present allowed.

Clearly, any uniform theory of rate making which affords at all an adequate remuneration on the general level of invested capital will make some roads very prosperous while leaving others more or less chronically on the verge of starvation. To deal with this, the Transportation Act provided that the Commerce Commission should make recommendations regarding a system of consolidation or grouping of the railroads of the country into a limited number of large systems, on the obvious theory that the inequalities in prosperity, and, therefore, in the funds available for necessary maintenance and growth, would thus be ironed out. How the consolidations would be brought about, however, the Transportation Act did not attempt to say, and the fulfillment of the plan in its present rather intangible form seems remote, on any basis of voluntary agreement between the carriers. After all, the ownership of the stock of the railroads, however much this ownership may be hedged about by legal limitations, is in private hands, and the private owner (both on the buying side and on the selling side of this transaction) must agree with the plan. If he is in the position of seller, he must otherwise be bought out on some basis which the courts hold fair under the Constitution. An extension of the right of eminent domain, or some similar principle, to force consolidations is only a form of government ownership. Without it, it would seem difficult to arrive at terms and conditions of consolidation which would be at once acceptable to the large railroad in the position of buyer and to the small railroad in the position of seller.

The Transportation Act legalized consolidations when approved by the Interstate Commerce Commission which, though desirable, might have been impossible under earlier laws. In this respect consolidations may become a very vital part of the program for railroad rehabilitation. Otherwise, the inequalities in credit will apparently deepen, rather than flatten out, and it will tend to be increasingly difficult to effect the reorganization of the properties in receivers' hands. Even today reorganizations are long-drawn-out affairs; the principal reason being that junior bonds or stock can rarely be used, as they were used in former reorganizations, to attract new funds. Stock at par offers no speculative inducements; a corollary of which is that reorganization must usually be done on a secured debt basis except so far as former holders of debt or preferred stock agree under the plan to accept a reorganization stock which is junior, in effect, to the security which they already hold. It seems obvious that railroad credit, in its broader significance, ought to mean the kind of public esteem which attracts equity investments; not merely the ability to sell evidences of secured debt, yet it is rarely indeed that even the strongest roads can attempt to finance by the sale of stock.

Funded Debt and Stocks

To illustrate this point it may be noted that the total increases in railway funded debt between 1911 and 1921 was $1,345,126,548; total increase in stock in the same period was $574,821,251, nearly all issued for bonds in reorganization and representing a sacrifice by the security holder; not a new investment. At the close of 1921 the funded debt amounted to 56 1/10 per cent of all railway capital (excluding switching and terminal combinations), and in that year only 56.35 per cent of railway stock was paying dividends.

The net result of all this is that the railroad reorganizer cannot appeal to the very elements of hopefulness or of speculative interest, or whatever one may choose to call the force of optimism responsible for building the American railroad system to its present stature; instead, he must rely on the much narrower appeal to the buyer of bonds. By instinct and training, the buyer of bonds turns to past performance rather than to future prospects. But the very fact that a road is in the hands of a receiver, indicates that the property about to be organized is necessarily deficient in past performance (although this may have been due to bad finance), however good its future prospects may be. Consequently, reorganizations are dragged out to inordinate lengths with heavy legal costs and general unsatisfactory conditions.

Consolidation in Britain

It should be noted in this connection that England has had a problem in some respects similar, but much less complex, in its efforts to amalgamate the railways of Great Britain into four groups. Yet this problem, according to the testimony before the House of Commons of Sir Frederick Banbury, chairman of the Railway Companies' Association, was so intricate, " . . . that it almost passed the wit of man to know how it could be solved." And this in a small compact country without the limitations of a fundamental constitutional law. At the present time, agreements have been reached between nearly all the largest British companies, although in some cases the terms of fusion still remain to be approved by the shareholders or require the sanction of the amalgamation tribunal appointed under the railways act.

This must be regarded as a remarkable achievement in finance, and it is important to note that administrative conditions were established so as to enable practical progress to be made with consolidation. For instance, the consolidations were made on the basis of the best year of net earnings the companies had ever had, plus a further sum equal to a return on the capital invested since that year. Next, the rate structure had been adjusted to the higher costs and taxation so as to be assured that the railroads would produce the proper amount of net earnings. The large expense of the usual stamp taxes for the exchange and conversion of securities was remitted. In substance, the government did not expect to get the benefits of consolidation without first of all providing a practical method for action within a reasonable time, and after that making it a matter of compulsion, which, under English law, Parliament could do.

If we interpret correctly the facts which have been stated, we are inclined to believe that the work-out of the group-consolidation plan should be regarded as a step towards the elimination of some of these difficulties, but that the practical machinery for putting any such plan into effect still remains quite unformulated.

Present Valuation Temporary

In any event, so long as the railroad system of the country, even under conditions of prosperity, is producing less than 5 per cent on the valuation figure accepted tentatively by the Interstate Commerce Commission, and so long as the government receives one-half the excess earnings above 6 per cent, it is not apparent that any general reductions of rates will be possible.

The looseness of the figures on which the fair-return calculations are based is apparent when we consider the fact that the mileage on which final valuations have so far been determined is only an insignificant part of the railway mileage of the country, and that even these valuations have not yet reached the test of a Supreme Court decision, although the work of the Interstate Commerce Commission, Division of Valuation, has been carried on actively for ten years at a cost well in excess of $75,000,000.

It is probably clear that we may regard the court as committed to recognition of the general principle that railroad property is entitled to earn a fair return on the actual value of that part of the property devoted to public use. It is also quite clear that the present determination of actual investment by the commission will be far out of date when it is completed, and that the decreased purchasing power of the dollar since the war will result in this figure being a very different thing from the cost of reproduction new, less depreciation.

The important gain to the holder of railroad securities, however, is the recognition of the constitutional principle. It will be a long time before the courts determine finally what the proper basis for valuation is, and a long time after that before any figure now in hand can be brought up to meet the requirements of the court decision, but, given the accepted principle of a fair return on a fair value, we have achieved a great step forward, and are probably more secure than we have been at any time in many years from unintelligent radicalism which fails to see that loss of credit and extension of facilities are two things which cannot go together. If the basic principle stands, and your committee believes that it will stand, the slow process of analysis and

judgment by the courts must in the end determine what elements of value are fairly to be included, and a figure found which will be a substantial protection to the investor not only under the present act, but in the event of any future program of government ownership or of extension of the principle of eminent domain for the purpose of forming group consolidations.

Your committee recommends to the association, therefore, that we express confidence in the fundamental principles underlying the Transportation Act of 1920. We believe that while the act contains certain imperfections it has, nevertheless, proved to be a long step in the direction of the solution of the American railroad problem, and that subject to such improvements in operation as experience may suggest it should stand as an expression of cardinal principles involving the complex relationships between the government, the shipper and the private owner of railroad securities. Unless these principles are clearly formulated and fairly administered, it is obvious that private capital cannot be expected to provide the extensions and betterments to the transportation system which are so vital to the adequate development of the country.

The report was signed by Ray Morris, chairman; Frank W. Remick, vice-chairman; Pierpont V. Davis, Thomas Newhall, Albert Strauss, F. J. Lisman, Jerome R. Hanauer, Joseph R. Swann, George Whitney, John E. Blunt, Jr., and B. Howell Griswold, Jr.

In discussing the report, Mr. Morris said that the country has had plenty of railroad regulation before, but in 1920 in passing the Transportation Act it adopted what might be called fundamental legislation in place of scattering, fragmentary legislation of earlier years. He said that the principle of a fair return on fair value in a way is as old as the Constitution of the United States, "but like Christianity, it has never been tried." Mr. Morris also said that in a country of 110,000,000, with popular temper what it is and what it is apt to remain, it would be better to make up our mind that public utilities are going to be regulated and confine the discussion to getting good regulation, rather than throw back 20 or 30 years and try to do away with regulation entirely.

Address by A. W. Krech

At the annual dinner on October 30, Alvin W. Krech, chairman of the Equitable Trust Company, also discussed the Transportation Act. After saying that "if there are any large individual fortunes materially dependent upon the income on railroad securities they are so few as to be notable exceptions, due in large measure to the unhappy intervention of tax-free securities," he continued in part:

The Transportation Act contains in it a limitation which will, in my opinion, if unchanged, defeat the primary purpose of the act. I refer to the provision by which, in substance, railroad security-holders are limited to a return of 6 per cent, and income over and above this amount is subjected to the control of the government, either through recapture or through the creation of restrictive reserve funds. In view of the hazards to which capital invested in railroads is subjected, this limitation, if unchanged, will in my opinion check and ultimately prevent the flow of new capital into railroads, except at the expense of the existing investment in those properties. An opportunity to retain for its own use not more than 6 per cent does not, under conditions as they now exist, or as they are likely to exist for some period to come, justify us in selling to the public shares of stock in new railroad enterprises, nor can shares of stock in existing railroad enterprises be sold at par on a 6 per cent basis.

The fact that the stocks of the best and most successful railroads—stocks which, if that success endures, are entitled under the Transportation Act to a return of more than 6 per cent (this on account of appreciation in value of the property), are selling in the market on a basis more profitable to the investor than 6 per cent, in my own opinion demonstrates that the farmers of the Transportation Act have missed the mark, and that unless economic conditions as they exist are recognized by our legislators, new capital cannot be recruited, and the act will fail of its purpose.

Latitude Needed for Owner

While the reasonable and scientific federal regulation of interstate commerce by a commission established for that purpose will always be necessary and desirable, in my opinion any system of laws which forbids the owners of property from dealing with that property in a manner admittedly proper, without first having obtained the consent and authority of a governmental body, is a mistake. Wrong doing should be punished, and punished promptly, but the power to do the right thing at the right time should not be conditioned on first obtaining the consent of an administrative official.

Any system by which the wages of employees are fixed by an administrative body charged with the power of fixing wages has no obligation to see that the person who pays the wages has the means with which to pay, the system is indefensible.

Any rule by which people embarking their capital in a hazardous enterprise are limited to a return for any one year less than that fairly obtainable in much less hazardous investments results in the long run in an actual taking or destruction of the value of the property already invested in the enterprise; under such circumstances the cost of obtaining new capital must ultimately absorb the existing investment, for new capital will only flow where it may voluntarily choose to flow.

So long as the law remains unmodified, funds essential to the growing transportation needs of the country will be unavailable.

Our primary duty is not so much the protection of the railroads nor the immediate interests of our clients, but lies in the much larger and forward looking responsibility of promoting the enduring welfare of the community as a national unit.

State Laws Regulating Vehicles at Crossings

LAWS REQUIRING ALL AUTOMOBILES to be stopped before crossing a railroad at grade are now to be found on the statute books of five states (with, in some cases, exceptions); and such laws, much varied in detail, are in force *as regards carriers for hire*, in no less than 16 states. These latter regulations are largely in the shape of orders by state public service commissions, made, in some cases, under general powers and not as a result of new legislation aimed particularly at the crossing danger. Seven states have regulations, applicable to all automobiles, requiring a reduction of speed but not calling for a full stop.

The existence of these laws and regulations would seem to indicate a very general appreciation of the gravity of the crossing peril and a purpose on the part of the authorities in many states to take measures to cure it wherever curative measures are possible.

Supplementing the fragmentary information heretofore given in these columns concerning laws on this subject there is presented here a table showing, so far as practicable, such leading features of these laws and regulations as may be useful to enable the reader to make an intelligent comparison between the situation in his own as compared with that in other states.

States With Strict Laws

The five states having the most comprehensive stop laws are Illinois, Montana, North Carolina, Tennessee and Virginia. The operation of the Illinois law is limited by a proviso that it shall apply only at crossings having an official stop sign, and these signs have been set up only at crossings which have been formally designated by the Corporation Commission as extra hazardous. The number thus designated is about four thousand five hundred.

The law of Montana has an elaborate modifying clause, as indicated in the table. That of North Carolina contains a weakening clause to the effect that local authorities (cities and towns) can still have their own way at crossings. This feature, whether we call it bad or good, will no doubt prevent or postpone uniformity of practice. The law of Tennessee has been on the books for six years but has been very largely disregarded. This condition, however, is not peculiar to Tennessee.

The states which report laws or regulations for automobiles applicable only to what may be called common-carriers are: Arizona, California, Colorado, Iowa, New Hampshire, New

Jersey, New York, North Dakota, Oklahoma, Oregon, Pennsylvania, Rhode Island, South Dakota, Utah, Washington and Wisconsin. Most of these regulations are in the shape of orders issued by commissions. That of the Public Service Commission of New York requires that the driver of a motor vehicle shall cross a railroad "with the transmission in not higher than second gear, in the case of progressive or selective type transmissions or low gear in the case of planetary transmissions; and in no case cross at a speed faster than 10 miles an hour." Other states have provisions similar to this.

Several of the statutes stipulate that after making the stop required by law, the driver shall "carefully look in each direction for approaching cars or trains and shall not start his vehicle until it has been ascertained that there are no cars or trains approaching the crosing in either directon." The Ohio rule, calling for a stop within 75 ft. of the track, requires it to be made "at points where the clearest view of approaching trains, locomotives or cars can be had." The driver, after stopping and looking, may "if certain that no train is approaching" cross in second gear, etc.

The following states report that no legislation on this subject is in effect:

Alabama	Minnesota
Arkansas	Mississippi
Connecticut	Nebraska
Delaware	Nevada
Florida	New Mexico
Georgia	South Carolina
Indiana	Texas
Kentucky	West Virginia
Louisiana	Wyoming
Maryland	

In Nebraska a stringent bill was introduced and discussed in the last session of the legislature but did not pass. In South Carolina, the state railroad commission issued an order regulating motor vehicles used for hire, but the authority of the commission was contested and this question is now before the Supreme Court of the state, pending an appeal.

In the table, column six, the figures—as, for example, Arizona 50-75, indicate the space limits; the stop is to be made not less than 50 ft. nor more than 75 ft. from the crossing.

HIGHWAY GRADE CROSSING LAWS

LAWS OF STATES AND ORDERS OF COMMISSIONS REGULATING THE PASSAGE OF AUTOMOBILES ACROSS RAILROADS

See Notes in Text *Part of Table on Next Page*

State	Statute	Action by commission	Vehicles included
Arizona		Order July 12, 1922	All motor in public service
California	Sec. 135, 1923		Automobiles carrying passengers for hire, or school children or explosive or inflammable goods.
Colorado	Chap. 127, 1913	Order No. 36, March 8, 1922	All for public transportation of passengers, including wagons, stages and sleighs.
Illinois	Sec. 145, b, July 1, 1921	Order No. 106, Dec. 14, 1922	All self-propelled
	Sec. 145, b, July 1, 1921	Order No. 106, Dec. 14, 1922	All self-propelled
Kansas	Sec. 5, chap. 74, L. 1917		All motor
Maine	Chap. 50, 1917		All self-propelled
Michigan	Act No. 270, 1921		Automobiles
	Act. No. 209, 1923	Order June 20, 1923	Automobile common carriers of passenger
Montana	Chap. 151, 1919		All motor
New Hampshire	Chap. 88, 1917		All automobiles
New Hampshire		Order July 25, 1923	Jitneys
New Jersey		Order July 10, 1922	All auto-omnibuses
New Jersey	March 23, 1923, to supplement Commission's order.		
New York	Sec. 53a, 1919		All, including animal drawn
New York		Order April 13, 1922	Stages and motor common carriers
North Carolina	March 6, 1923		All motor vehicles
North Dakota	H. B. 222, March 6, 1923	Rule 71, July 1, 1923	Passenger or freight vehicles of motor transportation companies
Ohio	H. B. 474, 1923	Order No. 81, July 28, 1923, Sec. 79.	Common carrier motor
Oklahoma	Senate bill 341, March 28, 1923.	Order No. 2219, June 19, 1923, Rule 23.	Common carrier motor
Oregon	Chap. 10, Special Session 1921.	Order No. 932, Rule 73	Passenger Common carriers, motor, including taxicabs
Pennsylvania	There is a general stop, look and listen law of long standing, but no statute dealing specifically with automobiles.		
Pennsylvania		P. S. C. General Order	Auto-buses and jitneys, freight or passenger
Rhode Island	Chap. 2221, Laws of 1922	Order No. 670, June 28, 1922, Rule 17.	Jitneys
South Dakota	Chap. 124, Laws of 1923	Order No. 5017, June 15, 1923, Rule No. 6.	Motor, common carriers
Tennessee	March 12, 1917	Warning notice issued by Department of Highway, 1922.	All motor
Utah		General order of Public Utilities Com.	Common carriers, auto
Vermont	G. L. 4697		Automobiles
Virginia	1922		All, including horse-drawn
Washington	Sec. 6350		All motor, for hire
Washington	Sec. 6350		All motor vehicles
Wisconsin	Chap. 206, June 4, 1923.		Passenger common carriers

Southern Pacific Provides Insurance for Employees

THE Southern Pacific Company has contracted with the Metropolitan Life Insurance Company, New York City, for a single policy, amounting to about one hundred million dollars for the benefit of its 90,000 employees. The railroad company proposes in this way to provide for insuring the lives of all employees who have been in the service for six months or more, the initial payment to be made by the company. After that, payment will be made jointly by the employee and the company. The contract will contain the usual privilege of taking out additional insurance up to a maximum of $3,500.

From a circular issued by Julius Kruttschnitt, chairman of the executive company, the following outline of the plan is taken.

The directors of the company have approved a plan giving, through the Metropolitan Life Insurance Company, to all employees in the service six months or more a certain amount of free life and total disability insurance, the premiums on which will be paid for by the company without any expense whatsoever to the employee. In addition to this, the company will afford the opportunity to employees to purchase additional group life insurance at rates far below the cost of ordinary individual life insurance, by assuming part of premiums on such additional insurance. The plan will become effective if and when 75 per cent of the eligible employees have subscribed to it, as required by the group insurance law. It is hoped it can be made effective by midnight, December 31, 1923.*

* The plan is offered to the employees of: Southern Pacific Company, including Atlantic Steamship Lines; Southern Pacific Lines in Texas and Louisiana and the Arizona Eastern Railroad Company. Also the following proprietary companies: Albion Lumber Company; Beaver Hill Coal Company; Central Pacific Land Company; Fresno Traction Company; Los Angeles Public Market Company; Los Angeles Union Terminal Company; Pacific Electric Land Company; Pacific Electric Railway Company; Peninsula Railway Company; Rio Bravo Oil Company; San Jose Railroads; Southern Pacific Building Company; Southern Pacific Equipment Company; Southern Pacific Land Company; Stockton Electric Railway Company; Visalia Electric Railway Company.

HIGHWAY GRADE CROSSING LAWS

LAWS OF STATES AND ORDERS OF COMMISSIONS REGULATING THE PASSAGE OF AUTOMOBILES ACROSS RAILROADS

Part of Table on Preceding Page — *See Notes in Text*

Railroads included	Requirements—exceptions	Penalties	State
All steam railroads.....	Stop 50-75. Except crossings having gates or flagmen.....	.....	Ariz.
Steam, electric, interurban or suburban.	Stop 10-50. { 1. Except crossings attended by traffic officers.....	$500, six months, or both.....	Cal.
	{ 2. Except on street railways in cities.....		
All except electric or other street railways in cities and towns.	Stop 20-75.....	.....	Col.
All	Reduce speed to 10 m.p.h. at all crossings.....		Ill.
	At crossings having a stop sign, *stop*.....	Max. $10	
All	Stop—20-75 except where there are gates or a flagman and except motors operating wholly within a city or town.	.....	Ia.
All	Reduce speed to 8 m.p.h. except in villages and cities.....	.....	Kan.
All	Reduce speed to 10 m.p.h. at crossing where warning signs have been put up. This excludes crossings in cities and towns.	Max. $10	Me.
All	Limit speed to 10 m.p.h.	.....	Mich.
All	Full stop at a point where view is clear.....	Revocation of permit.....	Mont.
All	Full stop, 10-100, at crossings outside cities and towns, where view is obscure, or where a train is within sight or hearing, except at crossings having a mechanical warning or flagman.	None	
All	Limit speed to 10 m.p.h. 0-100.....	Max. $50 and three months..	N. H.
All	Full stop 20-50	.....	N. J.
All	Full stop, 15-50, and shift gears to neutral position.....	.....	
.....	.....	First offense $50; second offense, max. $100 and 30 days.	
All	Reduce speed to a safe limit on passing cautioning signal on post 300 ft. from crossing.	.....	N. Y.
Steam railroad and electric interurban lines.	Stop 20-50; cross in second gear. See note.....	.....	
All railroads and interurban tracks.	Stop 0-50 except where there is a gate or a watchman and except at electric railways in cities and villages.	.....	N. C.
	Note: The law must not interfere with regulations prescribed by towns and cities		
All, including electric interurban.	Stop 20-50.....	.....	N. D.
All, including electric interurban.	Stop 0-75 where best view can be had.....	.....	Ohio
	Note: Exception—Crossings of electric railway in streets of municipalities....		
All, including electric...	Stop 0-50	Forfeiture of certificate (Rule 41).	Okla.
All	Stop 50-100	Revocation of permit.....	Ore.
.....	.....	.....	Pa.
All	Stop 0-75. Exceptions: Crossings of electric street railways in cities and boroughs	Revocation of certificate.....	Pa.
All, including electric and interurban.	Stop 20-50. Run in second gear and not over 10 m.p.h.....	Revocation of certificate.....	R. I.
All	Stop 25-100, except where there is a watchman.....	.....	S. D.
All	Stop, except where there is a watchman.....	$1 to $10.....	Tenn.
.....	.....	.....	Utah
No special reference to crossings.	Careless driving prohibited on all highways; speed limits named. Municipal authorities have power to limit speeds of motor vehicles on narrow or dangerous roads.	.....	Vt.
All main tracks outside of incorporated towns.	Stop 10-100	$10	Va.
All, including interurban	Stop 0-50, except in incorporated cities and towns and except guarded crossings..	.....	Wash.
All	Limit speed to 12 m.p.h.....	.....	
All, including interurban, but only "mainline tracks."	Stop 20-40, except crossings protected by gates or flagman; except interurban lines in streets of cities or villages.	$10 to $100, 10 days to 90 days, or both fine and imprisonment. Permit may be withdrawn.	Wis.

This plan of offering to employees the opportunity of obtaining free and low-rate life insurance will in no wise affect the rules and regulations of, or the benefits accruing from, the existing Southern Pacific hospital service and pension system.

Outline of the Plan

1. Each employee six months in the service will receive $250 life insurance, the premium on which will be paid for in full by the company, and at the expiration of one year's service this amount of free insurance will be increased to $500, continuing at that figure thereafter as long as the employee remains in the service.

2. In addition, employees one year or more in the service may purchase additional life insurance in the amounts and at rates specified below, the *actual cost* of purchasing such insurance in excess of these rates being borne by the company:

Rate of pay, monthly	Added insurance purchasable	Total insurance	Total monthly cost to employees
$150, or less	$1,000	$1,500	$0.70
Over $150, but not over $200	$2,000	$2,500	$1.40
Over $200	$3,000	$3,500	$2.10

The monthly rate of pay for employees not paid by the month will be computed by multiplying the weekly rate by 4 1/3, the daily rate by 26, or the hourly rate by 208, as the case may be. Should an employee who has neglected to take advantage within the prescribed period of the offer of additional insurance thereafter desire to take the full amount, a medical examination may be required before such additional insurance is issued, but one will not be required where the increased insurance is taken out by reason of advance in the employee's wage rate to a higher classification. Should an employee's wages be reduced, the amount of insurance will remain unchanged.

Total and Permanent Disability

In the event of total and permanent disability, resulting from either sickness or accident, before the insured attains the age of 60, no further premium will be collected, but the total life insurance carried under this plan will become payable to the insured in monthly installments as follows:

Amount of insurance	Number of instalments	Amount of each instalment
$250	5	$50.00
500	10	50.35
1,500	30	51.25
2,500	30	86.25
3,500	30	119.60

In the event of the death of such employee during the period of total and permanent disability, the present value of any instalments remaining unpaid shall be paid, in one sum, to the designated beneficiary.

Medical Examination

The free insurance paid for by the company will be without medical examination; neither will it be required for those desiring to take out additional insurance to which they are eligible, provided application for such additional insurance is made before December 31, 1923. As employees become eligible for additional insurance they will be allowed sixty days' time within which to make application for such insurance without medical examination. Failure to make application for additional insurance within the period specified will result in employees being required to furnish evidence at their own expense of the eligibility to the insurance company before insurance can be granted.

Certificates of Insurance

Each insured employee will be given as soon as possible a certificate showing the insurance carried by him, the name of the beneficiary, and a brief of benefits to which he is entitled.

Method of Securing Insurance

Eligible employees should fill out application blanks for insurance desired, including free insurance granted by the company, giving such information as required by the insurance company, in order that individual certificates may be issued. Making this application will authorize the railroad company to deduct from amounts due employees any premiums applicable to the insurance subscribed for.

Additional Features

Temporary Absence from Service. In the case of employees out of service temporarily through no fault of their own it will be optional with the railroad company, to continue insurance in force during such absence, in no event exceeding 90 days, collecting the usual premiums on additional insurance subscribed for by employees. Insurance will also be continued during unavoidable absence of employees who may be off duty because of sickness or accident.

Employees Leaving the Service Permanently. Should an insured employee leave the service permanently, the option is afforded within 31 days of obtaining from the insurance company, without medical examination, an equivalent amount of individual life insurance at rates applicable to his attained age.

Beneficiary. Immediately upon receipt of proof of death, payment of claim is made by the insurance company to the beneficiary named by the employee. The employee may at any time change the beneficiary upon written request. If there is no surviving beneficiary at the date of death, payment will be made to the family or estate of the employee as provided for in the individual certificate.

Pensioners. Employees retired on pension before the effective date of the insurance plan will be treated as actual employees with respect to free insurance given by the company. Employees retired on pension after the effective date of the insurance plan may retain the free and also the additional insurance carried by them, without change of rate, but may not apply for increased insurance after retirement.

Nursing Service. The Metropolitan Life Insurance Company, with which these arrangements have been made maintains in the centers where the larger number of our employees are located, a Visiting Nurse Service. If you are insured and live where this service is available, the nurse will call at your home, assist in carrying out the doctor's instructions, advise with those in your home regarding proper care, and do anything she can to make you comfortable. The nurse will call only at your own request.

Health Literature. The insurance company also publishes valuable booklets containing practical instructions on health, hygiene, and disease prevention. Through these booklets, it carries on a continual health campaign for the improvement of the health and the lengthening of life. To this service all insured employees will be entitled, as a privilege, under the Group Insurance Plan.

Changes in Plan. The board of directors of the company reserves the right to modify any of the conditions appertaining to this plan of insurance at any time by giving at least sixty days' notice to the employees.

Additional Insurance Not Compulsory

While the decision as to acceptance of the opportunity to secure the additional insurance rests entirely with the individual employee, this insurance plan is offered our employees only after a most careful investigation in the interests of themselves and their families.

THE TRANSPORTATION DEPARTMENT of the Texas Chamber of Commerce has passed a resolution recommending the appointment of Hon. Walter Splawn, of Austin, Tex., to fill any vacancy which may occur in the Interstate Commerce Commission.

Self-Propelled Cars for Branch Line Service

A. E. R. A. Committee on Heavy Electric Traction Extends Activities

AT THE ANNUAL CONVENTION of the American Electric Railway Engineering Association, held in Atlantic City, October 8 to 12, the Committee on Heavy Electric Traction presented a report which embodied a number of interesting features with reference to the development of electric operation, particularly in connection with the electrification of branch lines.

Bibliography of Electrification Data

There exists at the present time a very extensive bibliography on the subject of heavy electric traction which is being augmented continually. In view of the importance of this bibliography, the committee stated that it would be desirable to keep it up to date and in following out this idea, the bibliography has been checked and revised by Professor R. B. Warner of Yale University. It was suggested that a complete rearrangement of the list be made, classifying together all articles in a given periodical during any one calendar year, assigning to each article a reference number, and from this compiling the subject index which would then consist only of reference numbers as assigned to the preliminary list. The work would thus comprise columns (1) a group of articles in any one periodical (2) a chronological grouping, and (3) a subject index. Subsequent additions may readily be made as desired without material addition to the cost of printing.

It has also been suggested that the number of periodicals indexed be materially reduced, and only those included which contain consistently articles or papers of value on electrification in reasonable quantity. With a restricted list of periodicals, annual additions can be readily made and completeness insured.

The committee recommended that the suggestions be carried out and that a complete bibliography, rearranged as outlined, be compiled and printed next year and automatically revised from year to year.

Branch Line Electrification and Self-Propelled Cars

In some instances railroads having terminal electrification have extended such electrification over comparatively short branch lines in advance of extensive main line electrification, thus providing improved facilities for short haul suburban traffic. In other cases branch lines have been electrified by means of overhead trolley or third-rail in advance of terminals or main line electrification. In a few instances this has been done even when such electrification was not immediately contemplated. There are also instances where railroads have granted trackage rights to interurban traction companies over branch lines, the traction company installing overhead trolleys and operating an interurban passenger service, and a steam railroad continuing to operate freight and through passenger service with steam locomotives.

With few exceptions, branch line electrifications were made several years ago and there has been no material development during recent years. Your committee, therefore, had not made a comprehensive investigation of the situation involving the issuance of questionnaires, etc., feeling that such information would not be of material value, particularly in view of the fact that the recent tendency has been to substitute self-propelled cars for steam service on branch lines where through service is not essential and the maintenance of steam service is burdensome.

The self-propelled car (internal combustion engine, steam engine or storage battery) is undoubtedly of interest to those responsible for electric railroads as well as to the operators of steam railroad branch lines. The vehicle which can be operated on any track whether it is electrified or not is a valuable transportation facility, and under many circumstances can compete favorably with the electrified system. The operating problems of the steam railroad branch line are often quite analogous to those of the interurban electric road, especially when the traffic demands are relatively light, and the most economical solution in either case may be electrification; or it may be gasoline, storage batteries, or steam self-propelled cars. In at least one instance, electric operation of an interurban line has been abandoned in favor of gasoline rail equipment on account of a sudden falling off of business. Joint operation of various kinds of equipment is not uncommon and often provides a satisfactory solution for both local service and through traffic problems.

In 1912 an extremely comprehensive report was prepared covering the development of self-propelled cars. The cars developed at that time were of various types, such as gasoline, steam, compressed air, storage battery, etc. The most successful types, however, were gasoline cars with either mechanical drive, as in the McKeen car, or electric drive, as in the cars built by the General Electric Company; and light storage battery cars. The then recent development of the Edison cell had provided a stimulus to the use of storage battery cars.

Subsequent to 1912 an interruption seems to have occurred in the development of self-propelled cars for branch line operation and the manufacture of the two leading gasoline driven types was discontinued. Storage battery cars have continued in operation, but extension of service has been slow in recent years.

Recently, on account of serious financial conditions which have prevailed, and because of traffic problems brought about by competition from public and private automobiles, renewed interest in the self-propelled car has been manifested. A number of roads in this country and abroad have adopted and are operating successfully, a type of gasoline driven car considerably smaller than those which were most common in 1912. The development of the gasoline engine and mechanical transmission for automobile trucks has undoubtedly been largely responsible for this recent rapid growth of light, self-propelled, car operation. Many characteristics of these cars are identical with motor truck standards.

Although in this country and Canada the railroads which have adopted internal combustion cars have conservatively adhered to light vehicles with four-cycle gasoline engines, the normal weight being 15 tons, nevertheless in Europe the Diesel engine with electric drive is being developed in capacities up to 250 hp. and weights up to between 70 and 80 tons.

Questionnaires have been issued to companies operating self-propelled cars, in an effort to collect data of interest. Information has been received from about 30 companies operating internal combustion cars, three operating storage battery cars, and two operating electrified branch lines. The information is necessarily somewhat incomplete as some of the companies which operate cars of the type under discussion have not replied to the questionnaire.

The accompanying tables (Tables I and II) show information of interest regarding the operation of the various types of equipment.

Storage battery locomotives have been developed for indus-

TABLE I

Self-Propelled Cars for Branch Lines or Auxiliary Service

Company No.	Name of railroad	Track equipped with signal circuit	Number in service	Date placed in service	Manufacturer	Weights—(Lbs.) Total	Weights—(Lbs.) Driver and other trucks	Single or double end	Number in crew	Seating capacity	Speed — M. P. H. Max.	Speed — M. P. H. Av.	Average distance between stops (miles)	Max. grade (percent)
1	Atlantic City R. R. (R. & R. System)	No.....	1	Mar. 9, 1923	J. G. Brill.....	29,760	17,820-11,940	Single.....	3	40	40	35	1.5	0.77 & 0.49
2	Atchison, Topeka & Santa Fe...	Partially	2	1913	G. E. Co.....	125,390	76,890-48,400	Single.....	3	90	50	26.8	4.73	68.6
		No.....	1	June 3, 1917	Hall-Scott Motor Car Co.	67,120	.....	Single.....	3	50	.....	26	6.5	31.7
3	Atlantic & Western R. R.....	No.....	3	Oct., 1906	Edwards Ry. Motor Car Co.	17,000	50% on drivers	Single.....	2	50	35	25	3.0	3.8
4	Baltimore & Ohio.....	.....	1	Oct., 1922	Edwards Motor Car Co., Sanford, N. C.	17,220	7,640-9,580	Single.....	2	22	30	15	4.5	2.0
5	Cambria & Indiana R. R. Co...	No.....	1	Oct., 1022	Service Motor Truck Co.	29,880	.....	Single.....	2	40	37	20	3.0	4.5
6	Carolina, Clinchfield & Ohio Ry.	No.....	1	1916	G. E. Co.....	100,000	.....	Single.....	3	88	45	30	4.0	1.2
7	Central New York Southern R. R. Co.	No.....	2	1914	McKeen Motor Co..	74,000	.....	Single.....	3	83	60	40	6.0	1.5
8	Chicago Great Western.....	Yes.....	1	Feb., 1923	Service Motor Truck Co.	28,000	.....	Single.....	3	46	45	33	8 to 10	1.0
		Yes.....	1	Feb., 1923	Sykes Co., Kenosha, Wis.	.....	.....	Single.....	3	36	45	35	8 to 10	1.0
		Yes.....	3	1912	McKeen Motor Co., Omaha, Neb.	69,800	43,200-26,600	Entrance in center of car	3	80	50	33	8 to 10	1.0
9	Chicago, Rock Island & Pacific Ry. Co.	No.....	0	4 were placed in service, 1910	McKeen Motor Car Co.	68,000	2490c on drivers	Single.....	3	84	32.5	30	6.75	0.01
10	Cowlitz, Chehalis & Cascade Ry.	No.....	2	Mar., 1916 Feb., 1923	First car made in our shop; other by Hickey Motor Co.	12,000 21,000	....	1 single.... 1 double....	1 2	29 67	45 35	25	4.57	1.8 .....
11	Fonda, Johnstown & Gloversville R. R. Co.	No.....	2	Aug. 15, 1922	Service Motor Truck Co.	28,000	.....	Single.....	2	46	45	35	1.3	0.02
12	Fort Smith, Subiaco & Rock Island R. R. Co.	No.....	1	Just rec'd	Service Motors, Inc., Wabash, Ind.	.....	.....	.....		28-40	.....	.....	.....	3.75
13	Fresno Interurban Railway Co.	No.....	1	1916	Hall Scott Motor Co., Calif.	65,000	.....	Double.....	3	.....	35	10	1.0	1.0
14	Gilmore & Pittsburgh.....	No.....	1	.....	Mack Motor Car Co.	12,270	.....	Single.....	1	17	20	18	10	1.0
15	Great Northern.....	.....	1	.....	International Motor Car Co.	19,675	.....	Single.....	2	36	.....	.....	.....	.....
		.....	1	.....	Four Wheel Drive Auto Co.	17,000	.....	Single.....	2	.....	.....	.....	.....	.....
		.....	1	.....	White Motor Co....	.....	.....	Single.....	2	36	.....	.....	.....	.....
		.....	1	.....	Service Motor Truck Co.	26,000	.....	Single.....	2	38	.....	.....	.....	.....
16	Holton Interurban R. R.....	No.....	1	1912	Hall Scott Motor Co.	.....	.....	Double.....	2-4	.....	40	20	.....	1.0
17	Jonesboro, Lake City & Eastern R. R.	Yes.....	1	Sept. 1, 1922	The White Co. and Southland Motor Body Corp.	12,000	.....	.....	1	46	40	12.5	.5	.....
18	Nevada Copper Belt R. R. Co.	No.....	2	1910, 1913	Hall-Scott Motor Car Co.	70,000 80,000	.....	Single.....	2	48	40	35	12	3.25
19	Middletown & Unionville R. R. Co.	No.....	2	Mar., 1921 Nov., 1922	Reo Motor Car Co., Gramm Bernstein Motor Co.	9,750	.....	Single.....	2	18 & 30	35	25	4	1.86
20	New Orleans Great Northern R. R. Co.	No.....	1	Feb. 11, 1923	Service Motors, Inc., Wabash, Ind.	28,000	.....	Single.....	3	33	40	30	2.8	0.003
21	New York, New Haven & Hartford R. R.	Yes.....	3	Jan., 1922	International Motor Co., Osgood Bradley Co.	23,700	13,900-9,800	Single.....	2	35	45	22.4 21.6 23.0	5.0 2.6 2.6	.8 1.6 1.9
22	Northern Pacific Ry. Co.....	No.....	1	Sept. 12, 1922	Mack International Motor Co.	20,670	11,790-8,880	Single.....	2	35	35	28	4.3	1.2
23	Norwalk & Shelby R. R. Co....	No.....	2	Jan. 1, 1923	American Ry. Motor Car Co., Elyria, O.	28,000	.....	Single.....	2	42	35	25-30	1.5	6.0
24	Oklahoma Southwestern Ry....	No.....	1	Oct., 1922	Four Wheel Drive Auto Co.	17,500	Equally between two 2-wheel trucks	Single.....	2	16	30	12	2.5	.07
25	Penn. R. R. System.....	Yes.....	3	Feb., 1923	J. G. Brill-Service Motor Truck Co.	30,000	18,000-12,000	Single.....	2	44	45	37.5	.....	3.0
26	Quebec, Montreal & Southern Ry. Co.	No.....	3	Sept., 1922 April, 1923	Ledoux Jennings. Limited, Montreal, Canada.	19,000	Equally between other trucks.	Single.....	2	34-36	40	25-30	5.0	.9
27	Quincy R. R. Co.....	No.....	1	Mar., 1918	Meister & Sons Co., Sacramento, Calif.	14,000	.....	Single.....	2	24	20	15	5.0	4.0
28	St. Louis & San Francisco Ry..	No.....	1	1922	G. E. Co.....	110,000	74,000-36,000	Double.....	4	80	50	26	3.3	1.4
		No.....	1	1923	G. E. Co.....	110,000	74,000-36,000	Double.....	4	107	50	26	5.8	1.0
		No.....	1	1922	G. E. Co.....	110,000	74,000-36,000	Double.....	4	90	50	26.5	6.6	1.25
		No.....	1	1923	G. E. Co.....	110,000	74,000-36,000	Double.....	4	90	50	20	2.5	0.05
		No.....	1	1922	G. E. Co.....	110,000	74,000-36,000	Double.....	3	80	50	23	4.2	1.0
		No.....	1	1922	G. E. Co.....	110,000	74,000-36,000	Double....	3	80	50	25	3.0	0.8
		.....	1	1922	Midwest.....	28,000	74,000-36,000	Double....	3	36	45	26	4.5	1.63 1.53
29	Southern Pacific Co.....	Yes.....	19	1909-10-11	McKeen Motor Co., Omaha, Neb.	78,560	49,900-28,660	Single.....	4	62	33	24	2.8	2.2
30	Stone Harbor R. R. Co.....	.....	2	May, 1921	Brill Co., Mack Power Plants.	12,000	.....	Single.....	1	32	28	20	4	3.0
31	Tennessee, Kentucky & Northern R. R.	No.....	1	July, 1919	White Truck, St. Benard Body.	.....	.....	Single.....	1	20	25	20	4	3.6
32	Union Pacific R. R.	No.....	21	1908	McKeen Motor Car Co.	70,000	25,000-45,000	Single.....	3	72	50	35	5	2.0
33	Union Transportation Co.....	Yes.....	1	May, 1922	J. G. Brill Co.....	21,000	Half and half.	Single.....	2	42	32	30	3	1.5
34	Valley & Siletz R. R. Co.....	No.....	1	Jan., 1922	Hall-Scott Motor Car Co.	74,000	.....	Single.....	2	46	45	25	4	3.0
35	Yreka R. R. Co.....	No.....	1	June, 1908	Hall-Scott Motor Car Co.	36,000	.....	Single.....	2	24	20	20	8	2.3

TABLE I (Continued)

Self-Propelled Cars for Branch Lines or Auxiliary Service

Company No.	Mileage: Per day	Mileage: Per year	Length of run (miles)	Average number of round trips per day	Trailer capacity, tons	Engine: Rated h.p. (S. A. E. rating for gas engines)	Engine: Method of starting. Air or electric	Lighting system. Electric, gas or oil	Capacity of battery	Is same battery used for starting	Driving wheels: No.	Driving wheels: Are all solidly connected	Driving wheels: If not, describe drive	Type of clutch	Type of transmission
1	140±	40,656	13.6 & 12.5	4.5	0	36.1	Electric	Electric	160 amp. hrs., 12 volts.	Yes	4	No	Solid axle, bevel gear drive, wheels keyed on.	Brown-Lipe multiple disc.	Brown-Lipe
2	148	64,455	74	1	0	175	Air	Electric			4	No	2 elec. motors, one geared to each driving axle.		Elec., from gen. to motors.
	39	12,000	6.5	3		100	Electric	Electric	12 v.	Yes	2	No	Pinion gear	Friction	Sliding gear
3	100	36,500	25	2	30	71	Electric	Electric		No	4	Yes		Dry plate	
4	160		58		34	32.5	Electric	Electric	120 amp. hrs.	No	4	Yes		Single dry plate	Drive shaft to jack shaft, chained to rear wheel.
5	100	34,420	15 & 20	3	0	37.5	Electric	Electric	2–120 amp. ea. 6 v. in series.	Yes	4	No	Bevel type	Dry disc	Unit type and bolster sliding selective.
6	86	28,000	43 one way	1	0	200.0	Air	Electric			4	No	Motors on truck geared to axles.		
7	120		30	2	0	200.0	Air	Acetylene gas	Small, for starting only.	Yes	2	Yes		Disc, air operated	Herringbone gears
8	282		141	1	0	41–68	Electric	Electric	160 amp. hrs.	Yes	4	Yes		Multiple disc	Mounted with engine.
	264		132	1	38	80	Electric	Electric	120 amp. hrs.	No	4	Yes		Disc	Standard auto.
	150		75	1		200	Air	Gasoline			2	Yes		Special disc type	
9	130	14,931	130	1		200	Air	Gas (original), electric (now)	80 amp. hrs.	No	2	No		McKeen Octaroon & friction.	McKeen gear and chain.
10	160	58,400	20	4		60		Electric	12 v.	Yes	2	No	Connected to rear axle.	Single plate	Sliding gear
11	272	57,707	10–16 & 26	10	0	68	Electric	Electric	500 w.	Yes	4	No	Fixed hub and beveled gears type drive.	Brown-Lipe friction disc.	Brown-Lipe selective gear.
12	136														
13	28	10,220		1		250	Air	Electric			4	Yes		Drum	
14	120	37,440	74	1	0		Electric	Electric	12 volts	Yes	2	Rear axle full floating	Dual	Multiple disc	A–B Mack
15					0	40	Electric	Electric		No	2			Single dry disc	
					40	42	Electric	Electric			4			Mult. disc in oil	Colta 3-speed
					0		Electric				2	Yes		Single plate in oil	
					0	41.8–68	Electric	Electric	160 amp. hrs.		4			Mult. dry disc	3 speed, heavy duty.
16	25	8,000		2		160	Hand lever on face of fly wheel using pres. gas for combustion.	Electric	6–8 v.	No	2	Yes		Contracting band	Select. sliding.
17	125	1,500	30½	4	0	60	Electric	Electric	12 v.	Yes	2	Yes		Drum	Gears
18	34–132	35,000	14–24	3		150	Electric	Electric	180 amp. hrs.	Yes	2	Yes		Band & pulley	Hall-Scott
19	114	36,870	14.6	4		27.2	Electric	Electric	160 amp. hrs.	Yes	2	Yes		Disc	Gears
20	192	70,080	96	2	0	68	Electric	Electric		Yes	4	Yes		Mul. Brown disc	Selective
21	59.9 138.7 138.8	18,750 43,410 43,440	15.0 68.4 69.4	2 1 1	0	40	Electric	Electric	150 amp. hrs.	Yes	2			Multiple disc	Gears
22	122	44,530	122	1	0	40	Electric	Electric	140 amp. hrs.	Yes	2	No	Propeller shaft connected to axle by bevel gear; no differential.	Single plate disc.	Selective
23	310	152,000	32	8	0	36	Electric	Electric	150 amp. hrs.	Yes	4	Yes		Dry plates	Selective
24	122	44,500	122		36	60	Electric	Electric	12 volts	Yes	4	No	Pinion and ring gear, full floating axle.	Merchant & Evans multiple disc.	Cotter
25	108				0		Electric	Electric	150 amp. hrs.	Yes	4	Yes		Dry plate	3-speed gear
26	200		100 ea. way	1	0	50	Electric	Electric	90 amp. hrs.	Yes	4	Yes		Mult. dry disc	Standard Reo 3-speed.
27	25	7,500	6	2		60	Electric	Electric		Yes	Shaft driven			Friction	Geared
28	210	77,000	105	1	0	175	Air	Electric			4	No	Elec. motor, gear drive.		Elec. motor
	220	80,000	110	1		175	Air	Electric			4	No	Elec. motor, gear drive.		Elec. motor
	220	73,000	100	1		175	Air	Electric			4	No	Elec. motor, gear drive.		Elec. motor
	108	40,000	54	1		175	Air	Electric			4	No	Elec. motor, gear drive.		Elec. motor
	131	47,000	65.5	1	0	175	Air	Electric			4	No	Elec. motor, gear drive.		Elec. motor
	155	50,000	77.5	1		175	Air	Electric			4	No	Elec. motor, gear drive.		Elec. motor
	200	63,000	100	1	0	60	Electric	Electric	160 amp. hrs.	Yes	4	Yes		Bendix	
29	1,198	437,609	3.8–171	24	0	200	Air	Acetylene gas			2		From transmission to driving axle by chain.	Air operated	Gear and chain
30	30–50	12,000	4.5	10	24	98	Electric	Electric	120 amp. hrs.	Yes	4		Geared transm.		
31	76	30,000	19	2	15	35	Electric	Electric		Yes	2	Yes		Standard White selective.	
32	160	670,000	32–138	1		200	Air	Gas and electric	240 amp. hrs.	No	2		Morse chain	Castiron plate	Two-speed
33	150	54,700	25	3	0	30	Electric	Electric	160 amp. hrs.	Yes	2	No	Split axle; differential locked.	Multiple disc	Sliding gear, selective.
34	80	29,200	40	1		150	Electric	Electric		Yes	2	Yes		Split steel band	Axle susp.
35	24	8,200	16	1.5	0	94	Hand crank	Oil-electric	12 v.	Yes	2		Drives from rear axle.	Band	Planetary

TABLE I (Continued)

Self-Propelled Cars for Branch Lines or Auxiliary Service

Company No.	Number of speeds		Character of gear shift	Type of brake	Source of pressure for power brakes	Brake cylinder or diaphragm brake	Do climatic conditions present problems	Method of heating in winter	Is car heated when in storage	Is difficulty experienced in starting in cold weather
	Forward	Reverse			Main eng. exhaust, separate compressor or compressor connected to main engine					
1	6	6	Full selective	Westinghouse semi-autom.	Compressor connected to main engine by propeller shaft controlled by governor.	Cylinder		Hot air furnace	Yes	No
2	All speeds, zero to max., forward and reverse.			Air	Compressor connected to main engine.	Cylinder	No	Heater	Part of time	No
	4	4	Forward by spg., reverse by air.		Compressor connected to main engine.	Cylinder	No	Heater	Yes	No
3	4	4		Air	Separate compressor	Brake cylinder	No	Hot Air Furnace	No	No
4	3	3	Selective	Air	Separate compressor connected to rear axle.	Brake cylinder	Yes, heavy snow	P. C. Smith hot air heaters.	No	Sometimes
5	6	3	Sliding	Westinghouse	Separate compressor connected to main engine.	Brake cylinder	To some extent	Hot water circulating.	Yes	Yes, in extreme weather allow 20 min.
6	Variable speed motor.	Variable speed motor.		Westinghouse	Compressor connected to main engine.	Brake cylinder	No	Hot water heater	No	No
7	2	2		Air	Separate compressor connected to main engine (dulpicate source).	Cylinder	Useless in snow	Hot water	No	No
8	3	1	Standard auto	Air	Compressor connected to main engine.	Brake cylinder	Yes; some in cold weather.	Hot water	Yes; stored in roundhouse.	No
	4	1	Standard auto	Air	Compressor connected to main engine.	Brake cylinder	Yes; severe cold and snow.	Hot water	Yes; stored in roundhouse.	No
	2	1	Air shift	Air	Compressor connected to main engine.	Brake cylinder	Yes	Exhaust from eng	Yes; stored in roundhouse.	Sometimes.
9	3	3	Comb. air and mech.	Air	Compressor connected to main engine, also small auxiliary compressor (gasoline).	Cylinder	Yes	Hot water	Yes	Some
10	3	1	Selective	Air	Main engine exhaust	Diaphragm brake	No	Exhaust	No	No
11	6	3	Selective type	Semi-automatic	Separate compressor connected to main engine.	Cylinder	Some	Hot water	Yes	No
12										
13	3	3	Air		Separate compressor connected to main engine tank.	Diaphragm	No			No
14	4	4	Selective	Hand			Snow	Exhaust	Yes	No
15	4	4		Air		Brake cylinder		Exhaust		
	3	1		Air		Brake cylinder		Exh., coal heater		
	3	1		Hand				Exhaust		
	3	1		Westinghouse		Brake cylinder		Coal heater		
16	4	4	Select. sliding	Air	Compressor connected to main engine.	Cylinder	No		No	No
17	3	1	Standard auto	Automatic			No	Exhaust	No	No
18	4	4	Selective	Automatic	Compressor connected to main engine.	Brake cylinder	No	Water	Yes	No
19	4	1	Selective		Hand operated		No	Exhaust	No	No
20	6	6	Selective	Air and hand	Compressor connected to main engine.	Cylinder	No	Hot water	No	No
21	4	4	Selective	Air	Separate compressor connected to main engine.	Brake cylinder	Heavy snows block cars.	Exhaust	Yes	No
22	4	4	Selective	Air and hand	Compressor connected to main engine.	Cylinder	Extreme cold and snow.	Exhaust & stove	Yes	No
23	3	1	Lever	Air	Separate compressor connected to main engine.	Cylinder	No	Heaters	Yes	No
24	3	3	Clutch gears continually in mesh.	Band friction	Main engine exhaust	Diaphragm	No	Exhaut & heater	Yes	Yes
25	4	3	Standard lever	Air	Separate compressor connected to main engine.	Cylinder	To some extent	Hot air heater	Yes	Yes
26	3	3	Standard "H" type.	Hand	Main engine exhaust		Yes; winter	Exhaust	Yes	No
27	2	1	Clutch	Brakeshoes	Hand		Yes	Exhaust from eng	No	Yes
28	Unlimited to 50 M. P. H.	Unlimited to 50 M. P. H.		Air	Compressor connected to main engine, also separate auxiliary compressor.	Brake cylinder	No	Hot water heater	Yes	No
	Unlimited to 50 M. P. H.	Unlimited to 50 M. P. H.		Air	Compressor connected to main engine, also separate auxiliary compressor.	Brake cylinder	No	Hot water heater	Yes	No
	Unlimited to 50 M. P. H.	Unlimited to 50 M. P. H.		Air	Compressor connected to main engine, also separate auxiliary compressor.	Brake cylinder	No	Hot water heater	Yes	No
	Unlimited to 50 M. P. H.	Unlimited to 50 M. P. H.		Air	Compressor connected to main engine, also separate auxiliary compressor.	Brake cylinder	No	Hot water heater	Yes	No
	Unlimited to 50 M. P. H.	Unlimited to 50 M. P. H.		Air	Compressor connected to main engine, also separate auxiliary compressor.	Brake cylinder		Hot water heater	Yes	No
	Unlimited to 50 M. P. H.	Unlimited to 50 M. P. H.		Air	Compressor connected to main engine, also separate auxiliary compressor.	Brake cylinder		Hot water heater	Yes	No
	6	3	Standard	Air	Main engine exhaust, separate compressor connected to main engine.	Brake cylinder	No	Coal, hot air	No	No
29	2	1	Clutch	Air	Compressor connected to main engine.	Cylinder	No	Hot water	No	No
30	4	1	Hand, separate handle for reverse.	Air and band	Separate compressor, motor driven.		No	Exhaust	No	No
31	4	1	Selective	Manual			No	Exhaust	No	No
32	2	2	Sliding	Air	Separate compressor connected to main engine.	Brake cylinder	Yes	Hot water & stove	Yes	No
33	4	1		Hand and foot	Hand and foot		No	Hot water	No	No
34	4	4	Selective	W., E. & M. Co.	Compressor connected to main engine.	Cylinder	No	Hot water	In coldest weather only.	Not often
35	4	4		W., E. & M. Co.	Compressor connected to main engine.	Brake cylinder	Yes	Wood stove	No	Yes

TABLE II

Storage Battery Passenger Cars for Branch Lines or Auxiliary Service

Company No.	Name of railroad	Track equipped with signal circuits?	Number in service	Date placed in service	Manufacturer	Weights (Lbs.)		Single or double end	Length		Number in crew	Seating capacity	Speed (M. P. H.)		Average distance between stops (miles)
						Total	Drivers and other trucks		Wheel base	Car over all			Maximum	Average	
1	Canadian National Railways	No	2	May, 1921 Feb., 1923	Railway Storage Battery Car Co.	67,000 55,000	All on drivers	Double	5′–6″ 4′–6″	55′–0″ 36′–0″	2	50 30	48 36	21.5 22.2	4.5 3.0
2	Chattahoochee Valley Ry. Co.	No	2		J. G. Brill Co.	29,700		Single	13′–0″	32′–0″	2	30	20	15	.25
3	Lewisburg, Milton & Watsontown Pass. Ry.	No	1		J. G. Brill Co.	32,200	50% on drivers	Double			2	36	30		
4	Long Island R. R. Co.	Yes	2	1916	The Railway Storage Battery Car Co. & J. G. Brill Co.	28,000	All on drivers	Single	12′–0″	32′–9″	2	36	33	20	.67
		Yes	1	1911	Federal Storage Battery Co.	15,000	All on drivers	Single	8′–0″	26′–6″	2	26	30	18	.6

Company No.	Mileage		Length of run	Average number of round trips per day	Battery												Capacity of battery in ampere hours
	Per day	Per year	Passenger, freight, mixed (miles)		Type	Manufacturer	Number of cells	Voltage	Are end cells used?	Is battery removed for charging?	Type of charging facilities	Are charging facilities located at one or more places?	Number of charges per day	Aggregate length of time battery is on charge per day	Aggregate length of time battery is discharging per day	Is charging power purchased or produced?	Does the regular team crew take care of charging?	
1	128.6 108.0	40,252 33,804	64.3 Passenger.	1 1	Edison Storage and Exide.	Edison Storage Battery Co. and Electric Storage Battery Co.	250 110	300 220	No	No	Motor, generating set.	Each end of run.	2 1	7 hours. 6 hours.	6 hours. 5 hours.	Purchased.	No	450 540
2	96		9 and 7 passenger.	6	Edison	Edison Storage Battery Co.	150 208	250 350	Yes	No	Edison	One	3	4½ hours.	8½ hours.	Purchased.	Yes	90 60
3	68	24,820	11 passenger.	3														
4	190	66,180	7.3 passenger.	11	G–6–X	Edison Storage Battery Co.	236	283	No	No	Resistance grids.	On car.	12	12 hours.	9½ hours.	Produced.	Yes, part time.	150
	32.2	9,900	1.1 passenger.	7	A–6	Edison Storage Battery Co.	130	156	No	No	Resistance grids.	One	3	2½ hours.	2½ hours.	Produced.	Yes	300

Company No.	Motors				Number of driving wheels	Are cars equipped for M. U. operation?	Method of heating in winter	Is car heated while in storage?	Lighting system	Is propulsion battery used for lighting?	If propulsion battery is not used for lighting, give capacity of lighting battery			Brakes			Do climatic changes present problems?
	Number	Manufacturer	H. P. One hour rating, Natural vent	Voltage					Electricity, gas, oil		Ampere hours	Voltage	Number of cells	Type	Source of pressure for brake power	Brake cylinder or diaphragm brakes	
1	4 4	G. E. W. E. & M.	25 17½	250 176	8 8	No	Hot air	Yes	Electric	6 cells cut out for lighting.				Air and automatic air.	Electric air compressor.	Cylinder	No.
2	2	W. E. & M.	150	160 250	4		Hot air and stove.	Yes	Electric		90	15	8	W. E. & M.		Brake cylinder.	Yes, to some extent.
3					4		Hot water.		Electric	Yes				Air	Electric compressor.	Cylinder	No
4	2	W. E. & M.	20	250	4	Yes	Coal heater	Yes	Electric	No	150	6	5	Air	Compressor.	Brake cylinder.	They do, but overcome by placing batteries in compartments.
	2	G. E. Co.	10	120	4	No	Hot water.	Yes	Electric	No	300	6	5	Hand			No, as the hot water system keeps the batteries warm.

trial yard switching to some extent but their use is extremely limited. Those in service weigh from 20 to 40 tons and have tractive efforts up to 16,000 lb. on a one-hour basis. Lead cells are generally used for this class of equipment, usually at 200 volts and with capacities up to about 1,000 ampere hours.

Much remains to be done in connection with the collection of information on self-propelled cars, and the committee recommended that consideration be given to continued study of this interesting subject.

The work of the committee during the last three or four years has been largely the collection of data and information, and considerable effort has been made to keep away from the controversial subjects upon which formal decisions or recommendations would probably be somewhat difficult. On this account the reports have perhaps been somewhat incomplete. It was felt, however, that this was unavoidable and that specific recommendations were impossible because of inadequacy of data at the present time. This condition will disappear with the extending of electric operation; and opportuni-

TABLE II (Continued)

Electric Cars for Branch Lines or Auxiliary Service

Company No.	Name of railroad	Track equipped with signal circuit?	Type of car	Number in service	Date placed in service	Character of service: Passenger, freight, mixed	Manufacturer	Weights (Lbs.): Total	Weights (Lbs.): Drivers and other trucks	Single or double end	Number in crew	Seating capacity
1	Erie R. R. Co.	No	Two four-wheel trucks; four motors per car.	8	1907	Passenger		6—96,500 1—116,900 1—117,100	Equally divided	Double	2	36 56 70
2	N. Y., N. H. & H. R. R.	Yes	* Coach † Coach and open ‡ Coach § Coach	25 7 11 1	1895 1895 1907 1908	Passenger Passenger Passenger Passenger	G. E. and W. E. & M. Co. G. E. and W. E. & M. Co. G. E. and W. E. & M. Co. G. E. and W. E. & M. Co.	91,460 64,200 57,600 51,100	All on drivers for closed cars; 50% on drivers for open cars.	Double	2 to 4	57 68 39 32
3	Southern Pacific Co.	Yes		79 motors, 60 trailers.	14 in 1913, balance 1911.	Passenger		M.—114,000 T.—63,000		Double	2 to 4	116

Company No.	Speeds (M. P. H.): Maximum	Speeds (M. P. H.): Average	Average distance between stops (miles)	Maximum grade	Trailer capacity	Motors: Number	Motors: H. P.—One hour rating: Forced	Motors: H. P.—One hour rating: Natural	Motors: Voltage	Are cars equipped for M. U. operation?	Method of heating in winter	Lighting system: Electric, from traction power	Lighting system: Electric, from axle generator and storage battery	Brakes: Type: Passenger	Brakes: Type: Freight	Brakes: Source of pressure for brake power	Brakes: Brake cylinder or diaphragm brake
1	55	35–40	2	.5%	Two standard coaches.	4	125	100	440	Yes	Electric	Yes	No	Air and hand.		Motor - driven compressor.	Brake cylinder
2	45 23 17 24 20	23 17 .5 1.9 .9	1.0 1.2 1.9 1.2	1.1% .9	Three to six coaches.	4 4–2 4 4		80–140–160 80–160 40–80 40	600	Yes, for motor car; no, for trailer.	Electric	Yes		Air		Motor - driven compressor.	Brake cylinder.
3	43	15	.55	7.0%	116	4		140	600	Yes	None	Yes	No	Air		Motor - driven compressor from traction power.	Brake cylinder

Company No.	Mileage: Per day	Mileage: Per year	Length of run (miles): Passenger	Length of run (miles): Freight	Length of run (miles): Mixed	Reasons for electrification of this service	Do climatic changes present problems?	Type of contact system: Catenary	Type of contact system: Direct suspension	Type of contact system: Third rail	Normal height above track	Voltage	Type of collector: Pantograph	Type of collector: Trolley wheel	Type of collector: Third rail shoe
1	898	327,794	34.51			Economy	Slight snow interference.	Yes			21'–0"	11,000	Yes		
2	2,026 290 540 30	739,000 106,000 196,000 10,900	19.4 6.8 9.4 4.4	0 6.8 0 0		Economy; all are short branch lines feeding main line steam operated R. R.	Snow and sleet	Yes			22'–0"	600 D. C.		Yes, Miller shoe	
3	19,600	3,869,273	8.3			Quicker acceleration, resulting in reduction of running time; increased flexibility of operation; reduction of noise and smoke in congested districts; reduced operating costs.	No	Yes			22'–0"	1,200 D. C.	Yes		

ties for standardization of catenary construction, locomotive design, etc., may present themselves in the not distant future.

During the past few years the development of heavy electric traction has been of necessity somewhat slow on account of lack of funds available for expansion. Many railroads, however, have actively considered the question of electrification as a solution for their individual problems, and several engineering investigations have been completed and plans made for electrification, some of which have been delayed pending more favorable conditions.

The Norfolk & Western has completed and placed in operation an extension of its electrified zone from Kimball to Farm, a distance of about 20 miles, involving about 50 miles of single track. The road has purchased four additional locomotives for the extension; these are to weigh about 385 tons each. They are of split-phase type, as are the present locomotives, the principal difference being that the phase converter on the new locomotives is a synchronous machine which permits the attainment of virtually unity power factor at all times. The wheel arrangement is 2-8-2 + 2-8-2, the

halves of each locomotive being symmetrical and interchangeable. Each half has two motors, with a gear ratio of 21 to 100. The drive is by means of side rods and jack shafts. The continuous tractive effort at 14 miles per hour is to be about 90,000 lb. with an hour rating of about 108,000 lb. The four motors are rated at 1,000 hp. each.

The Pennsylvania Railroad is building three locomotives with identical series-wound, commutator motors. Two will operate on 600-volt, third-rail in terminal service in New York and the third, equipped for single phase operation, will be run between Philadelphia and Paoli.

The New York, New Haven & Hartford has purchased 12 new passenger locomotives of a type similar to those placed in operation in 1919. The wheel arrangement is 2-6-2 + 2-6-2 and the weight is to be approximately 180 tons. They are to have six pairs of twin motors with a gear ratio of 25 to 89. The continuous tractive effort at 40 miles per hour is 15,800 lb. The maximum tractive effort will be about 52,500 lb. The maximum safe speed will be 66 miles per hour. They are adapted to operation from the single phase trolley at 11,000 volts and from either an over-or-under-running third rail at 650 volts.

The Pennsylvania, the Long Island and the New York Central have each purchased considerable new multiple-unit equipment.

The Illinois Central, after an exceedingly thorough investigation has completed general plans for the electrification of its tracks at its Chicago terminal. The electrification will involve the main line to Matteson, the South Chicago branch, and the Blue Island branch; about 37 route miles and 125 miles of track. The system will be 1,500 volts, direct current, carried in overhead trolley.

The Virginian Railway has started electrification of its line from Roanoke to Mullens, a distance of about 134 miles, involving 213 miles of single track. The traffic is nearly all coal and very heavy trains are hauled. It is planned to increase the tonnage of loaded coal trains to 9,000 tons. The system will be 11,000 volts, single phase, 25 cycle. The locomotives will be similar to those purchased by the Norfolk & Western.

It is of interest to note the continuing upward trend after an interruption in growth of electrification. This reflects not only somewhat improved financial conditions but a recognition of the relative ease of maintaining electric locomotives as compared with steam locomotives under adverse labor conditions.

The members of the Committee on Heavy Electric Traction are as follows: A. H. Armstrong, R. Beeuwkes, J. M. Bosenbury, H. W. Cope, J. H. Davis, J. V. B. Duer, E. C. Johnson, Norman Litchfield, A. S. Richley, C. H. Quereau, L. S. Wells, H. A. Johnson, John C. Davidson, Vice-Chairman; Sidney Withington, Chairman.

Discussion following the presentation of the report consisted principally of laying plans for the continuation of the work of the committee. It was decided that the bibliography should be kept up to date and that information should be gathered as previously, covering progress made in the heavy electric traction field. In addition to this the scope of the committee will be broadened and information and data will be compiled covering subways, elevated railways and heavy interurban electric lines.

THE INTERNATIONAL COMMISSION, meeting in Paris on October 18, adopted the Westinghouse air brake as the standard for freight service in Europe, acting under authority of Article 370 of the Treaty of Versailles. The adoption of the Westinghouse brake is not exclusive and any other brake which can be used with it is admissible.

John Cholerton

Over 60 Miles an Hour

The Philadelphia & Reading's Boardwalk Flyer from Camden, N. J., to Atlantic City (Shown Above) Makes the 55.5 Mile Trip in 55 Minutes—Slightly Over 60½ Miles Per Hour—One Other Train in This Service Makes the Same Trip in 54 Minutes—A Speed of 61⅔ Miles Per Hour

General News Department

C. H. Markham, president of the Illinois Central will speak before the Chicago Shippers' Conference Association, November 6, on the Chicago terminal situation.

The Missouri-Kansas-Texas has increased the wages of shopmen 2 cents an hour, effective October 14. The increase will aggregate $226,000 annually and affects workers in all mechanical crafts.

The Interstate Commerce Commission has reopened its investigation into the cost of construction and repair of railway equipment in so far as it pertains to locomotives on the Erie. This is the proceeding in which the commission criticised certain railroads for the amount of the expenditures for repairs to locomotives in outside shops during 1920.

D. C. Coleman, vice-president of the Canadian Pacific, Western lines, with headquarters at Winnipeg, Man., will be the speaker at the next meeting of the New England Railroad Club to be held at the Copley-Plaza Hotel, Boston, Mass., on November 13. The subject of his address will be "A Railway's Contribution to the Development of a Nation."

November Meeting of Central Railway Club

The Central Railway Club will hold its regular monthly meeting on Thursday, November 8, at 8 p. m. at the Hotel Statler, Buffalo, N. Y. A film, called the "Jewels of Industry," illustrative of the manufacture of abrasives by the Carborundum Company of Niagara Falls will be shown on the screen, accompanied by a descriptive lecture by Francis Bowman, advertising manager of the company.

Canadian Grain Movement

The Canadian Pacific reports that in a period of 24 hours, ending on October 25, the number of cars of grain moved eastward from Winnipeg was 1,776, and the total for one week was 10,832. Both of these records are considerably above the best previous records. The number moved on October 25, 1921, was 1,579. The movement now reported consisted of 38 freight trains, and there were moved over the division eastward in the same time five first class trains. Passenger train No. 1, westbound, is said to have met a moving freight train every eight minutes throughout its run. At one tank on the Kenora subdivision 300,000 gallons of water were supplied to locomotives in the 24 hours and at the Kenora roundhouse a locomotive was moved off the turntable every nine minutes. Simultaneously with this movement of freight eastbound, 1,379 box cars were moved west.

Labor Board Decisions

The Labor Board has held that the telegraphers' agreement, dated December 15, 1919, between the Order of Railroad Telegraphers and the Arizona Eastern, was continued in effect by section 7, article 13, of Decision No. 2, and shall remain in effect until such time as it is abrogated or revised in the manner prescribed in the Transportation Act of 1920, and in accordance with the rules of the Labor Board. (Decision No. 1984.)

The Labor Board has held that it has no jurisdiction over those classified as supervisory agents by the Interstate Commerce Commission, in a dispute between the Philadelphia & Reading and the employees in the telegraph department. This dispute related to the inclusion of supervisory agents in agreements covering rules, working conditions and rates of pay. In its opinion, the board stated that "Under the law the board cannot declare that these supervisory agents are subordinate officials. The Interstate Commerce Commission has settled that question. On the other hand, the board would create a very awkward situation if it declared any part of the supervisory agents to be employees in the face of the Interstate Commerce Commission's virtual finding that they are officials. It would place the board's action in conflict with that of the Interstate Commerce Commission." (Decision No. 1985.)

The Labor Board has held that the abolition of the rate of time and one-half for overtime service to employees engaged in yard service on the Brooklyn Eastern District was in violation of the Transportation Act of 1920 and decisions of the board. It has ordered that conditions in effect immediately prior to such action shall be restored and continued in full force and effect. (Decision No. 1987.)

The Labor Board has decided that the rules promulgated in Decisions No. 721 and 1830 shall be embodied in and constitute an agreement between the Pennsylvania and its train dispatchers, represented by the American Train Dispatchers' Association. (Decision No. 1988.)

Wage Statistics for August

For the month of August, Class I steam roads reported to the Interstate Commerce Commission a total of 1,973,505 employees, an increase of 18,818, or 1 per cent over the number reported for July, and an increase of 379,431, or 23.8 per cent, over the returns for August, 1922. Strike conditions in August last year and the increase in business this year explain the large increase. The total compensation reported for August, 1923, was $270,187,583, an increase of $8,382,034, or 3.2 per cent, as compared with that for the preceding month. The monthly earnings, by groups, were as follows:

	Monthly earnings of—			
	Employees reported on daily basis		Employees reported on hourly basis	
Group	August, 1923	August, 1922	August, 1923	August, 1922
Executives, officials and staff assistants.	$428	$418	...	...
Professional, clerical and general.....	179	175	$125	$129
Maintenance of way and structures.....	239	237	95	86
Maintenance of equipment and stores...	245	251	130	*164
Transportation (other than train, engine and yard)	98	92	124	123
Transportation (yardmasters, etc.).....	260	258	149	156
Transportation (train and engine service)	...	...	193	192

*Comparatively high earnings due to large amount of overtime worked on account of strike conditions.

Ninety-Seven Per Cent Careful

The Pennsylvania Railroad adds to the highway crossing discussion a record which appears to be at once more comprehensive than most of those heretofore published, and more uniform in its findings. Careful observations of the conduct of thousands of automobile drivers at crossings, spread throughout thirteen states and covering a great variety of conditions, show a considerable degree of uniformity throughout a period of four months; and the percentage of carelessness averages 3.12 per cent. Information concerning the attitude, intelligence or experience of the inspectors is lacking, and comparison with other records, which show 25 to 60 per cent of the drivers to be careless, is still out of the question; but here are the figures for what they are worth:

AUTOMOBILE DRIVERS CHECKED AT SELECTED CROSSINGS IN THIRTEEN STATES, 1923

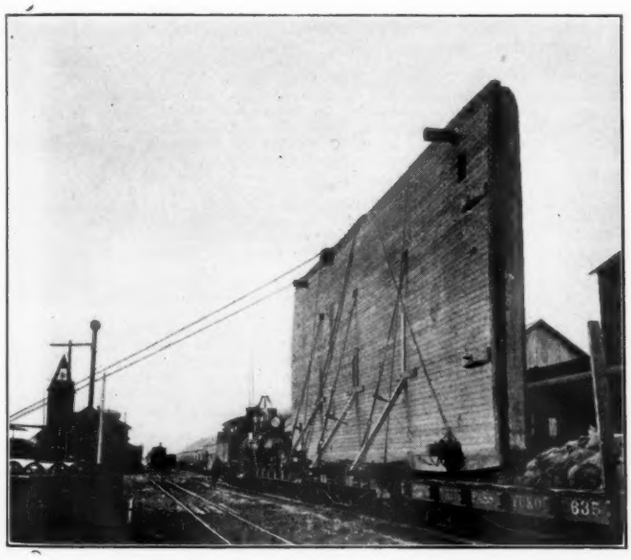
Month	Number of cars checked	Number of reckless drivers noted	Percentage of careless or reckless drivers
June	94,228	2,997	3.18%
July	93,836	2,802	2.98
August	34,979	1,301	3.72
September	19,099	466	2.44
Total	242,142	7,566	3.12

The statement adds: It therefore follows that the great bulk of accidents at highway crossings, as well as accidents on the streets and highways, may be charged to the carelessness of a very small minority of automobile drivers. Various forms of carelessness were noted by the inspectors; failing to look in either direction. . . . Disregarding the stop signal of crossing watchmen. Driving under crossing gates in front of trains while gates were being lowered. Running on crossings before stopping, not having car under control. Stalling on tracks. Stopping cars on crossings and turning around on tracks. Paying no attention to the locomotive warning whistle. Racing automobiles across the tracks to beat trains. Operating cars with defective brakes.

In the State of Virginia where there is a stop-law, the law was disregarded in a great many instances. In other states, that require omnibuses to stop, the law was also disregarded. Excessive speed was the most common form of carelessness noted, and occasionally cars were raced past other cars crossing the tracks. In one instance the driver nearly ran down a pedestrian and would not stop while the gates were being lowered.

A Traffic Item from the Yukon

The unusual piece of freight shown in the illustration is not a sheet of plate glass, 21 ft. wide and 60 ft. long, as may be thought at first sight; it is a barge of that size; and it was moved on the cars, as shown, for 43 miles, from Whitehorse, Yukon Territory, to Labarge. The photograph, sent us by a correspondent in British Columbia, bears a note to the effect that this load was



On the White Pass & Yukon Railroad

"rushed through" on a calm night, the railroad people feeling, no doubt, somewhat uncertain about their ability to keep the load in position if there should be much side wind.

The White Pass & Yukon Railroad is of 3-ft. gage and, presumably, has its full share of sharp curves. How fast the train was "rushed" around these curves is not stated. The rushing, no doubt, took place on those portions of the line where the right hand and the left hand rails were of the same height.

Lumber Dealers Oppose Change in Transportation Act

The following resolutions were adopted by the National Retail Lumber Dealers' Association, representing 5,000 retail lumber dealers, at its convention at Louisville, Ky., on October 10.

The National Retail Lumber Dealers' Association in common with all the substantial business interests of the country recognize the following propositions as axiomatic:

1. That adequate transportation service is essential to the successful conduct of all business and to the existence of prosperity in any and all lines of industry, whether agricultural, manufacturing, mining, mercantile, or financial.

2. That transportation is itself a business, and adequate transportation service cannot be rendered, and its instrumentalities cannot be maintained, unless given business as contradistinguished from political treatment.

3. That investment by the public in the creation of additional railroad facilities, as and when needed to meet the demands of growing commerce, cannot be expected, unless the investing public are given assurance against constant political agitation adverse to the industry in which investment is invited, and of reasonable certainty as to the stability of conditions which will surround and affect the investment.

4. That consequently the most vital interests of the people of the country are being seriously menaced by the continued agitation of certain politicians against the railroads and by constant proposal for changes in the existing system of governmental regulation.

5. In view of these considerations, it becomes the highest duty of statesmanship to prevent at this time changes in the Transportation Act, 1920, which has not been in effect sufficiently long under normal conditions to be adequately tested, and to resist the efforts of political agitators to further experiment with the vital industry of transportation.

Certainly there can be no legitimate interest of the shipping public which will not be adequately protected during a fair trial of the Act by its provisions as they now stand; for it provides that the rates shall be fixed or controlled by the government and not by the carriers; that all rates shall be reasonable and shall be fixed by the government at levels which, while embracing only rates that are reasonable, will satisfy the constitutional requirements of giving the owners of the property, as near as may be, "a fair return" on the value of their property used in performing the service; that the question of what amounts to "a fair return" shall be determined by the government and not by the carrier; that the "value of the transportation property" on which the fair return is to be estimated shall be fixed by the government and not by the carriers; that the question, "as related to rates," of whether "the management of the carrier" is honest, efficient and economical, and the "expenditures for maintenance of way and structures are reasonable" shall be determined by the government and not by the carrier; that the question of whether or not stocks or bonds shall be issued by the carriers, and, if so, in what amount and on what terms, shall be determined by the government and not by the carriers; and that all unjust discrimination and favoritism against, or in favor of, any of the carriers' patrons, shall be unlawful and will not be permitted by the government.

With such provisions there seems to be no ground for the fear that from the standpoint of the shipping public, carriers engaged in interstate commerce are not, under existing laws, strictly and completely regulated.

This association, accordingly, protests earnestly against continued political agitation directed against the railroads, which are the essential instrumentalities of distribution, because it can only result in the impairment of their transportation capacity on which the success of all business and the continuance of prosperity absolutely depend.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Joseph Sinkler, Pilot Packing Company, 122 South Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams St., Chicago.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—Grant Williams, 1341 Railway Exchange, Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 3, 1924, Montreal, Canada.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothchild, Room 400, Union Station, St. Louis, Mo. Next meeting, June 18-20, 1924, Buffalo, N. Y.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York. Next convention, October 8-12, Atlantic City, N. J.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamlin Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 30 Vesey St., New York, N. Y. Next meeting, November 8, Yale Club, 44th St., New York.

Division I.—Operating, J. C. Caviston, 30 Vesey St., New York, N. Y.
Freight Station Section (including former activities of American Association of Freight Agents).—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association).—J. C. Caviston, 30 Vesey St., New York, N. Y.
Safety Section.—J. C. Caviston, 30 Vesey St., New York.
Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents).—W. A. Fairbanks, 30 Vesey St., New York, N. Y.
Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago, Ill.
Division III.—Traffic, J. Gottschalk, 143 Liberty St., New York.
Division IV.—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next annual meeting, March 11-13, 1924, Chicago. Exhibit by National Railway Appliances Association.
Construction and Maintenance Section.—E. H. Fritch.
Electric Section.—E. H. Fritch.
Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 30 Vesey St., New York, N. Y. Next meeting, November 14, Hotel Pennsylvania, New York. Annual meeting, March 13 and 14, 1924, Chicago.
Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association).—W. J. Farrell, 30 Vesey St., New York, N. Y.
Division VII.—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill. Next convention, April, 1924, New Orleans, La.
Car Service Division.—C. A. Buch, 718 18th St., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—W. H. Hill, Agricultural Agent, New York Central, Chicago. Semi-annual meeting, December 6 and 7, Chicago; annual meeting, May 14-16, 1924, Savannah, Ga.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Fritch, 431 South Dearborn St., Chicago. Next annual meeting, March 11-13, 1924, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—W. C. Stephenson, Atlantic Coast Line R. R., Rocky Mount, N. C. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Building, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Prof. J. H. Dunlap, 33 W. 39th St., New York. Regular meetings 1st and 3d Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.
Railroad Division.—A. F. Stuebing, Bradford Draft Gear Co., 23 W. 43rd St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—P. R. Hicks, Room 1146 Otis Bldg., Chicago. Next convention, January 15-17, 1924, Muehlebach Hotel, Kansas City, Mo.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific Ry., St. Paul, Minn. Annual meeting, May, 1924, West Baden, Ind.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Annual convention, November 6-9, Hotel La Salle, Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H. Sts., N. W., Washington, D. C.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—John Nelson, Joseph E. Nelson & Sons, 3240 South Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrook St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Meetings, 2d Thursday, January to November, Hotel Iroquois, Buffalo, N. Y. Interim meetings, 2d Thursday, February, April, June, Hotel Statler, Buffalo, N. Y. Jubilee dinner, January 9. Hotel Statler.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sts., Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—D. B. Wright, 34th St. and Artesian Ave., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

DIXIE RAILWAY CLUB.—T. C. Schley, 71 Conti Street, Mobile, Ala. Regular meetings, bi-monthly, second and fourth Fridays, Battle House Hotel, Mobile, Ala.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3rd Friday in month, Room 1414 Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual convention, 1924, Chicago. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. B. Hutchison, 6000 Michigan Ave., Chicago. Next convention, May 26-29, 1924, Hotel Sherman, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—Bard Browne, Superheater Co., 17 E. 42nd St., New York. Meeting with International Railway Fuel Association.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 20-23, 1924, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—J. S. Penney, T. J. Moss Tie Company, St. Louis, Mo. Next convention, January 17-18, 1924, Muehlebach Hotel, Kansas City, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next convention, Dec. 4, 1923, Miami, Fla.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCE ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: E. R. Cott, Safety Agent, Hocking Valley Ry., Columbus, O.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Annual dinner, December 6, Hotel Commodore, New York. Regular meetings, 3rd Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa. Annual meeting and dinner, November 8, Hotel Commodore, New York.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—H. A. Varney, Sunbeam Electric Manufacturing Co., Evansville, Ind. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A. Division IV, Signal Section.)

RAILWAY STOREKEEPERS' ASSOCIATION.—(See A. R. A. Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Meeting with A. R. A. Division V.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A. Division I.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next convention, September 16-18, 1924, New York. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. L. Carrier, Car Serv. Agt., Tenn. Cent. Ry., 319 Seventh Ave., North Nashville, Tenn.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo-Ajax Corporation, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Association.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 605 North Michigan Ave., Chicago. Regular meetings, 3d Monday each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Bldg., Chicago, Ill.

Traffic News

The Erie Railroad on October 26 declared an embargo against shipments of apples and grapes from its western connections, these commodities having accumulated in great quantity at the New York terminus.

The Long Lac cutoff of the Canadian National which will connect the Canadian Northern main lines in Ontario with the transcontinental line will be ready for operation about November 15, This cutoff will save a distance of 70 miles between Montreal and Winnipeg and 102 miles between Toronto and Winnipeg.

The Illinois Commerce Commission is taking measures to prevent the sale of the Chicago, Peoria & St. Louis railroad in order to protect large investments in elevators and industrial property along the road. The sale of the road was recently authorized by the Circuit Court of Sangamon County.

The Missouri Pacific, the St. Louis South Western and the St. Louis-San Francisco announce that henceforth each passenger presenting baggage to be checked will be called upon to place a value on it; and where the value is more than $100 for 150 lb., a charge will be made of 10 cents for each additional $100.

The government barge line on the Mississippi river has announced that arrangements have been made with the Mobile & Ohio to establish through rates on freight (except grain) from St. Louis, Mo., to Birmingham, Tuscaloosa and Montgomery, Ala. Shipments are to be made from St. Louis by barge each Friday night, to be sent by rail from Memphis.

The Transportation Committee of the Merchants' Association of New York City has adopted resolutions recommending that the association call upon Congress to make no change in the fundamental provisions of the Transportation Act, 1920, until sufficient time has elapsed to enable shippers, and railroads, and the public, to fairly judge the effect of the existing law.

The Newark (N. J.) Chamber of Commerce has adopted, at a large meeting, the report of a special committee declaring that the interests of New York Harbor—which term is meant to include Newark—demand the carrying out of the plans of the New York Central to absorb the Central of New Jersey for the purpose of establishing a new through freight line to and from the west.

The Georgia Public Service Commission has announced that new freight rates have been prepared by the commission, on a considerable number of commodities, and notice has been given to railroads and shippers that objections to any of the rates proposed may be presented to the commission on November 26. It had been intended to have the changes go into effect on November 15 but the date has now been fixed for January 15.

Great Lakes Shippers' Regional Advisory Board Formed

The Great Lakes Shippers' Regional Advisory Board has been organized to cooperate with individual railroads and the Car Service division of the American Railway Association, the eighth board which has been established in the United States.

The territory of this board includes the lower peninsula of Michigan, the states of Ohio and Pennsylvania north of the main line of the Erie, and the state of New York west of the line of the Erie from Jamestown to Buffalo including Buffalo and the Niagara frontier. L. G. Macomber of the Toledo Chamber of Commerce, Toledo, Ohio, is chairman, and F. H. Baer of the Cleveland Chamber of Commerce, Cleveland, Ohio, is secretary. Members of the executive committee are W. S. Crowl, Detroit, Mich., S. E. Nixon, Westfield, N. Y., J. P. Daly, Buffalo, N. Y., F. R. Hathaway, Detroit, Mich., J. L. Lovett, Detroit, and M. W. Eismann of Erie, Pa.

Equipment and Supplies

Locomotives

THE SOUTHERN PACIFIC has ordered 20, 0-6-0 switching type locomotives from the Lima Locomotive Works.

THE NEW YORK CENTRAL, according to reports, has under consideration the question of purchasing a number of locomotives and cars. This information has not as yet been officially confirmed.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 10 Mikado type, 10 Pacific type and 5 Mountain type locomotives from the American Locomotive Company. The Mikado type will have 28 by 32 in. cylinders and a total weight in working order of 357,000 lb.; the Pacific type will have 25 by 28 in. cylinders and a total weight in working order of 297,000 lb.; the Mountain type will have 28 by 30 in. cylinders and a total weight in working order of 370,000 lb.

Freight Cars

THE BELT RAILWAY OF CHICAGO is inquiring for 47 center sills.

THE SPOKANE, PORTLAND & SEATTLE is inquiring for 60 logging car trucks.

THE NEW YORK, CHICAGO & ST. LOUIS is inquiring for 15 caboose cars.

THE PHILADELPHIA & READING is inquiring for 20 caboose cars and 50 stock cars.

THE GREAT NORTHERN is in the market for 500 stock cars with steel construction.

THE CAIRO, TRUMAN & SOUTHERN is inquiring for 30 logging cars of 40 tons' capacity.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for 100 or more combined ballast and coal cars.

THE ARGENTINE GOVERNMENT OIL FIELDS, Buenos Aires, are inquiring for 8 special gage tank cars of 10,000 gal. capacity.

Passenger Cars

THE LEHIGH VALLEY is inquiring for 25 milk cars.

THE LEHIGH & HUDSON RIVER is inquiring for 10 milk cars.

THE BALTIMORE & OHIO is inquiring for 50 coaches and four dining cars.

Iron and Steel

THE CLEVELAND UNION TERMINAL COMPANY is inquiring for 250 tons of structural steel.

THE NORFOLK & WESTERN is inquiring for 400 tons of steel for a number of small bridges.

THE MISSOURI PACIFIC has ordered 349 tons of structural steel from the American Bridge Company.

THE UNION PACIFIC has ordered one through plate girder span of 100 tons from the American Bridge Company.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 630 tons of structural steel, consisting of nine girder spans.

THE VICKSBURG, SHREVEPORT & PACIFIC has ordered 312 tons of structural steel from the Mt. Vernon Bridge Company.

THE VIRGINIAN RAILWAY has placed an order with the Carnegie Steel Company for 8,000 tons of rail, delivery to begin in March, 1924.

THE NORFOLK & WESTERN has placed an order for 18,000 tons of rail with the United States Steel Corporation interests.

THE CHICAGO, INDIANAPOLIS & LOUISVILLE has placed an order with the United States Steel Corporation interests for 4,000 tons of rail.

THE BALTIMORE & OHIO is inquiring for 900 tons of structural steel for bridges at Chicago and 300 tons for a bridge at Pittsburgh, Pa.

THE PHILADELPHIA & READING has ordered 25,000 tons of rail from the Bethlehem Steel Corporation and 10,000 tons from the Carnegie Steel Company.

THE MISSOURI-KANSAS-TEXAS has ordered 10,000 tons of rail from the Illinois Steel Company and 8,750 tons from the Tennessee Coal, Iron & Railroad Company.

THE MISSOURI PACIFIC has ordered 10,000 tons of steel rails from the Colorado Fuel & Iron Company, 8,000 from the Tennessee Coal, Iron & Railroad Company, and 14,000 from the Illinois Steel Company.

THE CHILEAN STATE RAILWAYS are inquiring for bids at Santiago, Chile, until November 27, for rails and accessories amounting to 15,274 tons of 100-lb. Chilean section rail. Bids are also wanted on the same date for 1,235 tons of accessories for lighter sections of Chilean section rail.

Signaling

THE CHICAGO JUNCTION RAILWAY has ordered from the Hall Switch & Signal Company seven sets of searchlight signals with a. c. universal relays and other apparatus.

THE ERIE is to install color light signals on the line between Bergen, N. J., and Hackensack, using Style "R" three-color light signals furnished by the Union Switch & Signal Company.

THE ILLINOIS CENTRAL has ordered from the General Railway Signal Company an electric interlocking, 73 working levers, for installation at Champaign, Ill., together with 34 switch machines and other material.

THE ST. LOUIS-SAN FRANCISCO has ordered from the Union Switch & Signal Company 122 style S semaphore signals, 280 d. c. neutral relays and 60 switch circuit controllers for 66 miles of automatic block signaling between Afton, Mo., and Monett.

THE PITTSBURGH & LAKE ERIE has ordered from the Union Switch & Signal Company 41 position-light high and 49 dwarf signals, with the necessary relays and transformers, for the installation of automatic block signaling between Pittsburgh, Pa., and Brightwood, and between Boston and McKeesport.

THE CANADIAN NATIONAL RAILWAYS ordered last week from the Union Switch & Signal Company automatic block signals for installation between Westfort, Ont., and Twin City. Color light signals will be used, a total of thirteen Style "R" signals with the necessary a. c. relays, transformers and switch indicators. This work will be carried out by the railway construction forces.

REPAIR of the damage to the railroads in the vicinity of Oklahoma City, Okla., caused by the recent floods along the North Canadian river, has been nearly finished and normal operation is again in effect. The latest flood was the least costly of the series of overflows which have occurred in Oklahoma this summer. In Oklahoma City itself, considerable damage was done to the yards of the Atchison, Topeka & Santa Fe, the St. Louis-San Francisco and the Missouri-Kansas-Texas, all of which were partially submerged. Such damage as occurred in this vicinity has now been repaired. On account of its high location, the yard of the Chicago, Rock Island & Pacific was not damaged but on its line east of Oklahoma City, particularly at points where it crosses the Canadian river, considerable stretches of track were washed out. The Frisco line between Oklahoma City and Sapulpa was also damaged in spots, as was the Santa Fe line north of the Oklahoma capital. Restoration of these lines, however, has been practically completed. The line of the Missouri-Kansas-Texas was only slightly affected by the high water.

Supply Trade News

The American Car & Foundry Company has ordered the structural steel for a foundry at Madison, Ill., from the Kenwood Bridge Company.

C. A. Dunn, formerly sales manager of The Weldless Tube Company, has been appointed manager of the **Delaware Seamless Tube Company,** Auburn, Pa.

The American Brake Shoe & Foundry Company has ordered the structural steel for a foundry building at Kansas City, Mo., from the Kansas City Structural Steel Company.

J. A. Cecce has been appointed assistant to the manager of purchases of the Consolidated Purchasing Agency for the **American Short Line Railroad Association,** with headquarters at Chicago.

J. T. Stephenson, formerly chief material inspector of the Southern Railway, has been appointed Washington sales agent for railroad supplies of the **Newport News Shipbuilding & Dry Dock Company,** Newport News, Va.

The Official Bureau of Railroad Time Service has made a change in its personnel as a result of which the Chicago office will be in charge of **L. L. Doty,** assistant general time inspector, who will have authority on lines west of Buffalo. The Boston office will be in charge of **C. T. Jenkins,** assistant general time inspector, who will have jurisdiction of lines east of Buffalo. **L. E. Blaike,** assistant general time inspector, will continue as heretofore. **Sidney Y. Ball** has been appointed general time inspector, succeeding W. F. Hayes, resigned.

Plans for a power plant to be put up by the **Western Electric Company** at Kearny, N. J., at a cost of $1,500,000, were filed recently with the municipal superintendent of Kearny, N. J. This is the first unit of a construction programme to cost about $20,000,000. The company has secured 60 acres in Kearny fronting on the Passaic river at the head of Newark bay as the site for its works, and also leased a three-story manufacturing building containing 110,000 sq. ft. floor space in Newark to be known as the Waverly shops. Another property containing 240,000 sq. ft. has been secured in Jersey City.

The Schubert-Christy Construction & Machinery Co., with offices in the Railway Exchange building, St. Louis, Mo., has been organized by **Frank H. Schubert,** district manager of the Wheeler Condenser & Engineering Co., and **Wm. G. Christy,** secretary, St. Louis section, American Society of Mechanical Engineers, and formerly with St. Louis Boat & Engineering Co. In addition to representing American manufacturers of power plant equipment, the new firm will render general construction engineering service and specialize in the design and construction of water cooling equipment for refrigerating and power plants, design of special machinery, etc.

The Compagnie Belgo-Mandchoue de Commerce, 39 Kitaiskaja, Harbin, Manchuria, is a large contractor for the Chinese Eastern Railway, and buys various materials for the road. It wants the names of American firms that can supply the following: Spare parts for railway cars and locomotives; tools for use on railways, hand tools for metal working, also wood working tools, and other miscellaneous tools; shovels; axes; iron pipes; copper pipes; valve cocks; pumps; bolts, nuts, etc.; merchant iron, sheet iron, corrugated iron; tool steel; builders' hardware, wire nails, also iron nails; electrical appliances; paints and varnish; railway scales and railway supplies, also a number of other products.

Obituary

Harry R. Rochester, western sales manager of the Hale & Kilburn Corp., with headquarters at Chicago, died October 28 at Atlantic City, N. J.

Charles Proteus Steinmetz, chief consulting engineer for the General Electric Company, died on October 26 from acute dilation of the heart at his home in Schenectady, N. Y. He was born on April 9, 1865, in Breslau, Germany, where his father was in the employ of the government railway service. He was educated in the universities of Breslau and Berlin and in the Polytechnic in Zurich, Switzerland, his specialties being mathematics, electrical engineering and chemistry. He was deeply interested in politics, having strong socialistic proclivities which were responsible for his being driven out of Germany. He escaped to Austria and later went to Switzerland where he met an American student who induced him to come to America. In 1889 he arrived in New York, at the age of 24, penniless and in ill-health. Through the efforts of his American traveling companion, he was permitted to land. His first position was in the drafting room of Osterheld & Eickemeyer at Yonkers, N. Y., where he received $2.00 a day. In a remarkably short time, Mr. Steinmetz made a name for himself by his original work on electric motors and generators and by his masterful articles which appeared in scientific papers. Eventually he became the chief consulting engineer of the General Electric Company in which capacity he was able to carry on, unhampered, a vast amount of research work in electrical engineering. That the steam locomotive was doomed by the advances of electricity was his firm belief and he frequently made the statement that railroads would adopt electrification as soon as they could finance it. He was the author of many books on electrical engineering dealing principally with the theory and higher mathematical calculations of the more complex phases of electrical problems. It has been said of Mr. Steinmetz that his great mathematical ability, combined with his keen perception of the phenomena which go on in electrical circuits, made his contributions to this field of engineering problems more notable than those of any other engineer.

P. & A. Photo

Charles P. Steinmetz

Trade Publications

CHARCOAL IRON BOILER TUBES.—A 52-page brochure, citing a few instances of the high resistance of Parkesburg charcoal iron boiler tubes to corrosion and long service life, has been issued by the Parkesburg Iron Company, Parkesburg, Pa. Following a brief outline of the physical properties of charcoal iron and its corrosion resisting qualities, is an interesting illustrated story of the Parkesburg process of manufacturing boiler tubes from the charging of the forge fire to the final inspection and test of the finished product. Attention is also called to "Recommended Practice for the Application and Maintenance of Charcoal Iron Boiler Tubes, Arch Tubes and Superheater Flues," by G. H. Woodrooffe and C. E. Lester, which is now available in book form.

PYLE-O-LYTE is the name given to the latest bulletin issued by the Pyle National Company, Chicago. The bulletin, which is also known as catalogue No. 4, contains 28 pages, illustrating and describing the applications of Pyle National equipment to the various phases of railroad and construction lighting. There are many photographs and diagrams showing the different types of lighting units, together with the specifications for each. Lamps and reflectors are shown giving descriptive and dimensional tables. A portion of the bulletin is devoted to the explanation of flood-lighting calculations which is clearly set forth by diagrams and sample calculations fully worked out. The different types of Pyle National turbo generators are illustrated ranging in capacity from 500 watts to 7½ kw., and steam turbines for various purposes.

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company will open bids on November 5 for the construction of a ten-story reinforced concrete office building at Topeka, Kans., plans for which were reported in the *Railway Age* of March 31.

ATCHISON, TOPEKA & SANTA FE.—This company has authorized the construction in 1924 of the following units in expansion of the terminal facilities at San Bernardino, Cal.: A boiler shop with tank shop and stripping pit, 600 ft. by 160 ft., to cost $900,000, with mechanical equipment; extension of erecting bay of locomotive shop; installation of a new transfer table; extension of the present machine shop, 200 ft. by 196 ft. Of the appropriation of $2,800,000, $600,000 will be spent this year.

BALTIMORE & OHIO—Contracts placed by this road with the Jobson-Gifford Company, New York, and the Kelly-Atkinson Construction Company, Chicago, cover respectively the erection of the superstructure for a new highway bridge crossing the tracks of its Pittsburgh division, near Buhls, Butler county, Penna., and the erection, concreting and waterproofing of a grade crossing elimination bridge near Salisbury Junction, Pa., where the railroad is intersected by an improved state highway. The highway bridge at Buhls consists of two plate girder spans, 94 ft. and 81 ft. long, respectively, replacing an old timber structure; the bridge at Salisbury Junction is a double-track through plate girder span, 54 ft. in length, encased in concrete and provided with a solid floor.

CHICAGO, MILWAUKEE & ST. PAUL.—This company plans the construction of a new enginehouse and shop at Monticello, Iowa, to cost approximately $60,000.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has awarded a contract to the Howlett Construction Co., Moline, Ill., for the construction of a 400-ton electric automatic coaling station of frame construction, with sanding equipment, at Rock Island, Ill.

GULF COAST LINES.—This company plans the construction of a new enginehouse and repair shop at Brownsville, Tex., to cost $100,000.

ILLINOIS CENTRAL.—This company plans the construction of a two-story freight station and two-story passenger station at Baton Rouge, La., to cost $500,000. Both buildings will be of brick and stone construction. Bids will be called for in a few weeks.

INTERNATIONAL-GREAT NORTHERN.—This company contemplates the construction of a bridge over its tracks near Houston, Tex., at a cost of approximately $40,000, to eliminate grade crossings.

KANSAS & MISSOURI RAILWAY & TERMINAL COMPANY.—This company has been authorized by the Interstate Commerce Commission to construct a belt line in Wyandotte county, Kan.

LOUISVILLE RAILWAY (Electric).—This company is preparing plans for the construction of an interurban union station, 200 ft. by 500 ft., at Louisville, Ky., to cost approximately $1,250,000. The lower floors of the building will be used for stores, waiting rooms and platforms and the upper floors will be devoted to office space.

NEW YORK, CHICAGO & ST. LOUIS.—This company will construct a new enginehouse and locomotive repair shop at Fort Wayne, Ind., on land recently purchased as a site for a new freight terminal and yard, as reported in the *Railway Age* of September 29.

PENNSYLVANIA.—This company will elevate its tracks at the present grade crossing at Main street, Toledo, Ohio, and will eliminate other grade crossings in that city at a total cost of approximately $750,000.

PHILADELPHIA & READING.—This company has awarded the following contracts in connection with its new engine yard at Rutherford, Pa.: To C. W. Hunt & Co., West New Brighton, N. Y., for the furnishing and erection of buildings for coaling station, sand facilities, and furnishing and installation of all coal handling and

sand handling machinery equipment and dryers complete with all appurtenances; to the Belmont Iron Works, Philadelphia, Pa., for the furnishing and erection of steel crane runway complete and for the furnishing f. o. b. cars at Rutherford of the structural steel required for twin ash pits and four inspection pits and connecting tunnel; to Fish, Bower, Rutherford, Philadelphia, Pa., for the construction of ash pits, crane runway foundations, inspection pits, water column foundations, grading, water supply and drainage.

PHILADELPHIA & READING.—Approximately $1,600,000 will be spent by this company for new machinery, additional piers and other ore handling equipment at Port Richmond, Philadelphia. This equipment will be in addition to the new grain elevator being built there at a cost of $3,000,000 and the new McMyler coal dumper at a cost of $1,250,000.

The present ore pier at Port Richmond was built twelve years ago when the most modern machinery was installed. For the past twelve years this plant has averaged 36,067 tons per month. During the present year, however, this business has developed so rapidly that additional facilities have become necessary. In May, 1923, 80,901 tons were handled; in June, 1923, 72,142 tons; in July, 1923, 106,727 tons; August, 1923, 98,785 tons, and in September, 1923, 90,025 tons. It is estimated that the business handled by this plant during the present year will total 1,000,000 tons. The plans for the additional ore handling facilities call for the enlarging of Pier 14 and the installation of another set of ore handling machinery at an estimated cost of $915,000. When this machinery has been installed the machinery on the present pier will be overhauled and renewed as business permits. A new pier will also be built south of Pier A to relieve Pier 14. The approximate cost of this work will be $600,000. Extensive work will also be done on the boiler house, including the installation of a new 1,000 hp. boiler.

PHILADELPHIA & READING.—This company has awarded a contract to the Curtis-Grindrod Company, Philadelphia, for the furnishing and erection of a one-story brick building, 13 ft. 5 in. wide by 89 ft. 3 in. long, built on concrete foundations, in connection with the new terminal at Camden, N. J. This building will contain washroom and locker facilities and storage space for the accommodation of employees working in the yard. It will be provided with lighting, heating, plumbing and appurtenances.

SOUTH AUSTRALIAN RAILWAYS.—A contract has been awarded to the Roberts & Schaefer Company, Chicago, for the construction of nine reinforced concrete and steel coaling stations, the largest to be of 300 tons' capacity including sand handling facilities. The Roberts & Schaefer Company will supervise the construction of each plant in Australia. The coaling stations will be located at Mile End, Peterborough, Adelaide, Karwonda, Port Adelaide, Port Pirie, Wolseley, Cockburn and Port Lincoln.

SOUTHERN.—This company has awarded a contract to the Smallman-Brice Construction Company, Birmingham, Ala., for the construction of a passenger station at Selma, Ala., to cost $25,000.

SOUTHERN.—This company is calling for bids for the construction of a passenger station at Lexington, N. C.

ST. LOUIS-SAN FRANCISCO.—This company contemplates the construction of a new passenger station at Enid, Okla.

TERRE HAUTE, INDIANAPOLIS & EASTERN (Electric).—This company is preparing plans for the construction of new car barns and shops at Richmond, Ind., to cost $50,000.

TEXAS ELECTRIC.—This company will construct a passenger station at Ennis, Tex., at a cost of $17,000.

UNION PACIFIC.—This company has awarded a contract to the Unit Construction Co., San Francisco, Cal., for the construction of an enginehouse with a repair department, 75 ft. by 175 ft., at San Pedro Harbor, Los Angeles, Cal.

UNION PACIFIC.—This company contemplates the construction of a subway under its tracks at Thirty-eighth street, Denver, Colo., for the accommodation of street traffic. According to the plans, the Union Pacific will pay 70 per cent of the cost and the city of Denver the remainder.

WYOMING NORTH AND SOUTH.—The Department of the Interior has denied this company's application for a right of way across the public lands of the Salt Creek oil field in Wyoming, for a distance of about 20 miles.

Railway Financial News

ATCHISON, TOPEKA & SANTA FE.—*Asks Authority to Acquire Extension.*—This company has applied to the Interstate Commerce Commission for authority to acquire by lease an extension of the Rocky Mountain & Santa Fe from Raton to Sugarite, N. M., 9 miles, which the latter company has asked authority to acquire. The tracks were formerly owned by the Santa Fe, Raton & Eastern.

CANADIAN PACIFIC.—$5,000,000 *Stock Issue.*—The National City Company and the Guaranty Company of New York are offering an issue of $5,000,000 Canadian Pacific Railway Company 4 per cent coupon consolidated debenture stock at 79½, to yield approximately 5.05 per cent. The issue is non-callable and is secured by a first charge on the entire railroad organization subject to a few exceptions as provided under Dominion law. As of December 31, last, there was $253,229,865 of the debenture stock outstanding, which has a priority over $80,681,921 preference stock and $260,000,000 common stock.

CHICAGO, PEORIA & ST. LOUIS.—*Petition to Reopen Abandonment Proceeding Denied.*—The Interstate Commerce Commission has denied a petition of Herbert A. Tuohy, chairman of a committee that asked for a reopening of the proceeding in which the commission authorized the abandonment of the railroad.

DENVER & RIO GRANDE WESTERN.—*Argument Before I. C. C.*—Final arguments following protracted hearings in the Interstate Commerce Commission's investigation of this company's application for authority to issue securities and for approval of its plan of reorganization were held before Division 4 of the commission at Washington on October 29. The application was opposed by the state of Colorado on the ground that it does not provide for sufficient new money for the improvement of the road, and the attorney general of the state said they would prefer to have the receivership continued.

KANSAS CITY TERMINAL.—*Authorized to Issue Notes.*—This company has been authorized by the Interstate Commerce Commission to issue $10,000,000 of 3 year, 5½ per cent secured gold notes at not less than 97½, the proceeds to be used in paying $9,850,000 of secured notes maturing November 15; and also to pledge $13,783,000 of first mortgage 4 per cent bonds as security for the notes. Arrangements have been made for the sale of the notes to Lee, Higginson & Co.

MINNEAPOLIS & ST. LOUIS.—*To Pay Interest.*—Judge Booth, of the United States Federal District Court in Minneapolis, has directed the receiver of this road to pay interest due on November 1 on the consolidated 5 per cent bonds of the company, and also previous coupons that have matured on these bonds and which have not been presented for payment.

Charles E. Graham, of New York, vice-president of the Newport News Shipbuilding & Drydock Company, has become a member of the stockholders' protective committee, of which Pierpont V. Davis is chairman.

MISSISSIPPIAN.—*Asks Authority to Issue Securities.*—This company has applied to the Interstate Commerce Commission for authority to issue $75,000 of stock and $350,000 of first mortgage, 7 per cent gold bonds for the purpose of constructing a line from Amory to Fulton, Miss., John T. Cochrane, Mobile, Ala., president.

MISSOURI PACIFIC.—*Equipment Trusts Sold.*—Kuhn, Loeb & Co. have sold, subject to the approval of the Interstate Commerce Commission, $3,990,000 5½ per cent equipment trust certificates, maturing in equal annual instalments from November 1, 1924, to November 1, 1938, both inclusive, at prices to yield 5.81 per cent for average maturities.

NEW YORK CENTRAL.—*Six Months' Guaranty Certified.*—The Interstate Commerce Commission has issued a final certificate to the Secretary of the Treasury placing the amount of this company's guaranty for the six months' period following federal control at $25,282,637, of which $5,282,637 was to be paid on the final certificate.

PERE MARQUETTE.—*Bonds Sold.*—J. & W. Seligman & Co., Kidder, Peabody & Co., Hayden, Stone & Co. and associates have sold $12,500,000 first mortgage 5 per cent bonds, series A, at 93¾ and interest, to yield over 5.40 per cent. The bonds are due July 1, 1956. They are secured by a direct first mortgage on all of the company's American mileage and on about $30,000,000 book value of rolling stock. They are also subject to only $3,000,000 of Canadian divisional bonds, a first lien on all of the company's Canadian mileage.

PITTSBURGH, FORT WAYNE & CHICAGO.—*Asks Authority to Issue Stock.*—This company has applied to the Interstate Commerce Commission for authority to issue $21,595,900 of 7 per cent common stock, and the Pennsylvania Railroad has applied for authority to assume, as lessee, obligation and liability in respect thereof. The stock is to be issued to the Pennsylvania in partial settlement for additions and betterments made between 1918 and 1922.

SEABOARD AIR LINE.—*Authorized to Issue Bonds.*—This company has been authorized by the Interstate Commerce Commission to issue $2,750,000 of refunding bonds and $764,500 of first and consolidated mortgage bonds.

TRANS-MISSISSIPPI TERMINAL.—*Authorized to Extend Notes.*—This company has been authorized by the Interstate Commerce Commission to extend the maturity date of $3,653,000 of notes from November 1, 1923, to November 1, 1924, with interest at 6½ per cent, instead of 6 per cent, and to sell $1,000,000 of the notes at par and accrued interest. The Texas & Pacific, the Missouri Pacific and receivers of the Texas & Pacific were also authorized to guarantee the notes.

VICKSBURG, SHREVEPORT & PACIFIC.—*Resumes Common Dividends.*—This company has declared a dividend of 2½ per cent to common stockholders of record October 19, 1923, payable October 30, 1923. The last dividend on the common stock was in September, 1920, when a like amount was paid.

Bonds Offered.—Spencer, Trask & Co., and Canal-Commercial Trust & Savings Bank, New Orleans, are offering a block of new refunding and improvement mortgage 6 per cent bonds at 97 and interest, to yield about 6.20 per cent. The Interstate Commerce Commission, as noted in last week's *Railway Age*, has authorized this issue.

Railroad Administration Settlements

The United States Railroad Administration reports the following final settlements, and has paid out and received from the several roads the following amounts:

New York, New Haven & Hartford Railroad Co.	$3,316,500
Kentucky & Indiana Terminal Railroad Company paid Director General	50,000
Cleveland, Cincinnati, Chicago & St. Louis Railway Company paid Director General	5,000,000
Michigan Central Railroad Company paid Director General	10,500,000
SHORT LINES	
Fordyce & Princeton Railroad Company	4.500

Dividends Declared

Central of New Jersey.—2 per cent, quarterly, payable November 15 to holders of record November 7.

Vicksburg, Shreveport & Pacific.—Common, 2½ per cent, payable October 30 to holders of record October 19.

Trend of Railway Stock and Bond Prices

	Oct. 30	Last Week	Last Year
Average price of 20 representative railway stocks.	58.21	58.86	69.50
Average price of 20 representative railway bonds	81.84	81.92	86.40

EMPLOYEES of the Great Northern have organized a club at St. Paul, Minn., to be known as the Great Northern Railway Club, whose purpose is to develop a spirit of fellowship, friendly cooperation and mutual helpfulness. All employees at St. Paul over 21 years of age are eligible for membership. The club proposes to hold weekly luncheon meetings.

Railway Officers

Executive

S. B. Wight, manager of purchases and stores of the New York Central Lines with headquarters at New York, has been appointed assistant to the president with the same headquarters.

The executive board of the National Railways of Mexico has elected officers as follows: **Alberto J. Pam,** president; **Eduardo Ortiz,** vice-president, and **Leon Salinas,** executive president.

W. M. Duncan, chairman of the board of the Wheeling & Lake Erie with headquarters at Cleveland, Ohio, has been elected president as well, with the same headquarters, succeeding S. Ennes.

Charles S. Krick, whose election as vice-president of the Eastern region of the Pennsylvania with headquarters at Philadelphia, Pa., was reported in the *Railway Age* of October 27, page 794, was born at Reading, Pa., on March 16, 1866, and was graduated from Lafayette College in 1887. Shortly after his graduation he entered railway service as a rodman on the Pennsylvania, since which he has been consecutively rodman, assistant supervisor and supervisor, until January 1, 1903, when he was promoted to assistant engineer. In 1906 he was promoted to principal assistant engineer and in 1907 to division superintendent, remaining in that capacity until November 6, 1915, when he was promoted to general superintendent of the New Jersey division. In 1918 he was promoted to assistant general manager, Lines East, and on March 1, 1920, he was promoted to general manager, Eastern region, which position he held at the time of his recent election as vice-president. His entire railway service has been with the Pennsylvania.

C. S. Krick

Mechanical

C. J. Bauman has been appointed supervisor of boiler inspection and maintenance of the New York, New Haven & Hartford with headquarters at New Haven, Conn.

W. C. Stone, master car builder of the St. Louis-Southwestern with headquarters at Pine Bluff, Ark., has resigned to become mechanical superintendent of the American Refrigerator Transit Company with headquarters at St. Louis, Mo., succeeding T. E. Parker, resigned.

H. C. Manchester, superintendent of motive power and equipment of the Delaware, Lackawanna & Western, with headquarters at Scranton, Pa., has resigned, and **C. J. Scudder,** superintendent of the Scranton shops, has been appointed acting superintendent of motive power and equipment.

J. E. Brown, mechanical engineer of the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., has been promoted to assistant superintendent of motive power, with the same headquarters, a newly created position. Mr. Miller will take over the duties formerly discharged by W. C. Stone, master car builder, who has retired. **E. J. Kueck** has been

appointed mechanical engineer, with headquarters at Pine Bluff, succeeding Mr. Brown.

John H. Daley, master mechanic of the Boston division of the New York, New Haven & Hartford, has been appointed mechanical superintendent, Lines West and Central New England Railway, succeeding A. A. Harris, assigned to other duties. **J. P. Egan** has succeeded Mr. Daley on the Boston division. **D. P. Carey** has been appointed master mechanic of the Midland division. **J. B. Wyler** has been appointed to a similar position on the Hartford division, as have **L. G. Marette** on the Old Colony division and **O. H. Ritter** on the New Haven division. Mr. Marette succeeds C. U. Joy, assigned to other duties.

Purchasing and Stores

W. C. Bower, assistant manager of purchases and stores of the New York Central Lines with headquarters at New York, has been appointed manager of purchases and stores with the same headquarters, succeeding S. B. Wight, promoted.

Operating

William A. Wood, chief clerk to the general manager of the New York, Ontario & Western, has been appointed division superintendent with headquarters at Norwich, N. Y., succeeding **William C. Hartigan,** who at his own request has been relieved from active duty.

Robert V. Massey, whose promotion to general manager of the Eastern region of the Pennsylvania with headquarters at Philadelphia, Pa., was reported in the *Railway Age* of October 27, page 794, was born at Dover, Del., on September 29, 1871, and graduated from Sheffield Scientific School of Yale University in 1892. He began railroad work in the construction department of the Pennsylvania on September 1, 1892, and remained in that department until August, 1895, when he was transferred to the maintenance of way department, in the office of the principal assistant engineer at Altoona, Pa. In November of the same year he was appointed assistant supervisor at Freeport, Pa., and on April 1, 1897, was transferred to Baltimore, Md., as assistant supervisor of the Baltimore division of the Northern Central. He was transferred to Mifflin, Pa., as assistant supervisor of the Middle division of the Pennsylvania on April 1, 1899, and in 1900 was promoted to supervisor of the Schuylkill division. He then went with the Philadelphia, Baltimore & Washington in the same capacity and in 1905 was transferred as supervisor of the Pittsburgh yard. On April 1, 1907, he was promoted to division engineer of the Schuylkill division and was transferred to the New York division on January 1, 1909. In March, 1911, he was appointed superintendent of the New York, Philadelphia & Norfolk and the Cape Charles, with headquarters at Cape Charles, Va. On February 11, 1914, he became superintendent of the Manhattan division with headquarters in New York, and on May 1, 1916, when the Manhattan and New York divisions were consolidated, his title was changed to superintendent of the New York division. He was appointed general superintendent of the Eastern Pennsylvania division with headquarters at Altoona, Pa., in June, 1917. On July 1, 1918, he was transferred to the New Jersey grand division in the same capacity and on March 1, 1920, he was promoted to assistant general manager of the Eastern region, the position he held at the time of his recent promotion.

R. V. Massey

C. I. Leiper, whose promotion to assistant general manager of the Eastern region of the Pennsylvania with headquarters at Philadelphia, Pa., was reported in the *Railway Age* of October 27, 1923, page 794, was born at Wallingford, Pa., on October 28, 1874. He graduated from Swarthmore College in 1895, after which he took a special course at the University of Pennsylvania. In 1897 he entered the service of the Pennsylvania in the construction department. He went to Altoona as transitman in February, 1901, and the following March was made assistant supervisor on the Maryland division. He was promoted to supervisor on the same division in 1903, later serving as supervisor on the Pittsburgh division and the New York division. In August, 1909, he was appointed division engineer of the Manhattan division, and in 1911 he went to the New York division in the same capacity. He was made principal assistant engineer of the Philadelphia, Baltimore & Washington on June 16, 1913, and the following February was appointed superintendent of the New York, Philadelphia & Norfolk, at Cape Charles, Va., from which position he was promoted on June 16 to superintendent of the New York division of the Pennsylvania. In February, 1920, he was promoted to general superintendent of the New Jersey division, Eastern region, which position he held at the time of his recent promotion.

C. I. Leiper

Obituary

William Buchanan, president of the Louisiana & Arkansas with headquarters at Texarkana, Ark., died in that city on October 26. Mr. Buchanan was born on September 14, 1849, at Petersburg, Tenn. He entered railway service in 1898 as president of the Louisiana & Arkansas, the position he held at the time of his death.

C. D. Gorham, former superintendent of the Buffalo division of the New York, Chicago & St. Louis, who retired from active service in 1904, died at Fort Wayne, Ind., on October 24. Mr. Gorham was formerly superintendent of the Fort Wayne division of the Pennsylvania, to which position he was appointed in 1887, and later was superintendent of the Chicago division of the New York, Chicago & St. Louis. At the time of his retirement, he was superintendent of the Buffalo division of the New York, Chicago & St. Louis.

William J. Bohan, assistant general mechanical superintendent of the Northern Pacific with headquarters at St. Paul, Minn., died in that city on October 27. Mr. Bohan was born on November 3, 1873, at Waukesha, Wis., and graduated from the College of Engineering of the University of Wisconsin in 1895. He entered railway service in September of that year as an inspector of electric signals on the Chicago, Milwaukee & St. Paul, three years later being promoted to electrician in charge of electric train lighting at the Western avenue yards in Chicago. In May, 1900, he was appointed electrician in charge of electric train lighting on the Northern Pacific at Portland, Ore., and in February, 1903, was promoted to electrician in the mechanical department. Mr. Bohan was promoted to chief draftsman in the mechanical department on May 1, 1905, and on January 1, 1909, was again promoted to electrical engineer. On January 1, 1910, he was promoted to mechanical engineer with headquarters at St. Paul, Minn., and was promoted to assistant mechanical superintendent in October, 1918. He was promoted to assistant general mechanical superintendent with headquarters at St. Paul in August, 1920, and was holding this position at the time of his death.